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THE

SCHOOLMASTER:

ESSAYS ON PRACTICAL EDUCATION,

SELECTED FROM THE

WORKS OF ASCHAM, MILTON, LOCKE, AND BUTLER;

FROM

THE QUARTERLY JOURNAL OF EDUCATION;

AND FROM

LECTURES DELIVERED BEFORE THE

AMERICAN INSTITUTE OF INSTRUCTION.

IN TWO VOLUMES.—VOL. II.

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THE SCHOOLMASTER.

PARTICULAR BRANCHES OF EDUCATION.

ON TEACHING READING.

By CHARLES BAKER,
AUTHOR OF "A TEACHER'S LESSONS ON SCRIPTURE CHARACTERS."

(From the Quarterly Journal of Education, No. XV.)

THE early instruction of children is a subject deserving of all the attention which it has received from some of the most profound thinkers. During the last few years various alterations, and, in some instances, improvements, have been proposed upon the old plan of teaching reading. The success of these attempted reforms has been comparatively trifling, either from teachers being the last to learn, or from the public being averse to innovations, however plausible in appearance. It is certainly an undeniable fact, that we see around us, if not the horn-books of the last century, at least the same machinery by which the memory was drilled into the names of letters and words in the dark ages. In the National and other popular systems of education twelve precious months are still required for teaching children to read. In private schools and families as much time is spent in attaining the same object. Why bad plans should oppose such a barrier to change and improvement, when more rational systems are proposed, it is not now our purpose to examine, any further than may be incidentally necessary to the elucidation of the

method which we propose for simplifying the mode of imparting a knowledge of written language to children.

In all communities there are a few minds considerably in advance of the many; a few who will think and act for themselves, in spite of the trammels imposed by custom. The prevalent errors on the subject of which we are about to treat have been long felt by solitary individuals. Evidence enough is at hand that improvements on the old system of teaching reading have taken place, and some few fortunate children have been initiated into language, without undergoing the toil of the alphabet and the spelling-book. But these are rare exceptions; the infant mind is still generally committed, during the first years of its intellectual existence, to the tender mercies of the dame and the schoolmaster, who preside over its progress with a book in one hand, and a rod in the other. The reluctance of mankind to adopt shorter methods of acquiring knowledge originates in a spirit as unenlightened as that which opposes itself to improvements in the machinery of our manufactures. A portion of the community, it must be allowed, who were not unfriendly to the more rapid progress of their children in the elements of knowledge, would have yielded to their better convictions, had they not been afraid of upsetting the infant's vehicle, by attempting to conduct it over a path never travelled by themselves. From this, and various other causes, the art of teaching to read has been as nearly stationary as possible, and it is much to be feared, that, unless a powerful conviction can be created of its unfitness for the purposes of popular instruction, the minds of children must still continue to struggle in the fetters of an antiquated and ill-adapted system.

An attempt will be made in the present article to show how a child may be taught to read, with less trouble and anxiety to the teacher, and with more improvement and pleasure to the taught, than is generally found to accompany such a progress. The suggestions relative to the first stages of instruction will be found in some measure applicable to infant schools; and those referring to the more advanced stage—learning to read—will be equally applicable to the other schools for the young.

It is no uncommon thing to be introduced to some prodigy of learning in a family, the two or three-years-old pet of some good-natured aunt, or perhaps nearer relative, and to be invited to pass judgment on his acquirements after witnessing an exhibition of his abilities—these acquirements often amounting to a very perfect knowledge of the twenty-six letters, a repetition of verses, and a catechismal examination on the Scriptures—all learned by rote. Some well-meaning persons, not versed in such matters, have frequently marred such exhibitions by ill-timed interference and cross-examinations, equally offensive to both child and parent. The sensible visiter will allow such scenes to pass before him in silence; the early age of the child forbids us to suppose that he understands all that he has been taught to repeat.

The present mode of teaching the art of reading is not more defective as an instrument for unfolding the capacities of the intellect, than for communicating the knowledge and pronounciation of words. An imperfect utterance is almost universal in the young, for want of the application of a few simple corrective principles. By well-adapted exercises, and careful repetitions, the

pronunciation of most children of three years' old may be made almost perfect. Inattention to this in early years is the cause of much of the defective utterance that we observe in youth, and in grown-up persons. A child's manner of speaking is too much disregarded; if it be intelligible, it is deemed sufficiently correct to pass current. The imperfection being no great obstacle to its progress in knowledge, it is thought that, as the child grows older, the evil will correct itself. Like other errors, which, from being unnoticed at first, settle into vices, this evil sometimes produces a faulty habit of speaking which can never be eradicated. By patient care on the part of the teacher, this defect is often very much modified, and in many instances removed; but that this is not always the case the immense number of imperfect speakers bears ample evidence; and if there is a possibility of preventing such impediments by early attention to a child's pronunciation, it is surely better to attain this certain good, which may be attained without trouble or annoyance to the child, than to force it to utter words above its comprehension, and to dole out sounds which nobody can understand.

It is not to be supposed that stammering can always be prevented by early care. Sometimes this affection proceeds from mental excitement, and sometimes from organic defects; even in such cases the evil may be considerably diminished by a proper treatment at the time of its first appearance.

Correct pronunciation is the first thing to be attended to in the education of children, and childhood is the period most suitable to its attainment. When too volatile to apply its mind to books, a child will receive much pleasure in being talked to, and in being heard

to talk; and no one will deny that this is a more rational way of occupying the thoughts, than for it to be employed in poring over the forms of the letters, and attaching sounds to them of which it cannot conceive the meaning.

The names of objects should be taught simultaneously with pronunciation, care being taken that the utterance is in all cases full and distinct. It will not be necessary to classify all words according to their syllabic formations, such a classification being only necessary with words which the child utters imperfectly. The *l*, the *w*, the *d*, the *r*, and the *y* are often difficult letters for a child to pronounce: *table* is called *tabin; elephant*, *a-yephant; wood*, *vood*; *dog*, *gog; rabbit*, *thabbit* or *yabbit; yesterday*, *thesterday*, &c. In all such instances of mis-pronunciation, words should be selected containing the unpronounceable letter, which should be very deliberately articulated in its different combinations, the child being made to observe the different position of the organs of speech, as different sounds are produced. We cannot refrain from giving one instance which we recently observed, showing the facility with which infant pronunciation is corrected. A child of about two and a half years old called a *stick*, a *kick*. Being desired to pronounce it again, *kick* was again repeated. She was desired to imitate the low, hissing sound of *s*, as used in this combination, which she did correctly; the sound of *t* was also clearly uttered, both singly and preceded by the *s*; the termination *ick* followed, also correctly: so that it was clear that the child could pronounce separately all the sounds composing the word, and that there was no real impediment to the pronunciation of the whole word. The word was then deliberately

uttered, the sounds of the *s* and *t* being lengthened, and the child being made to observe the position of the organs during the utterance. The effect of this dissection was, that the child repeated the word quite distinctly many times in succession.

It is unnecessary, in what must be merely the outline of a plan, to enumerate the varieties of combinations in which difficult letters are to be discovered, and the means by which such difficulties may be removed. The instructor will readily apply the principle, and extend it to those sounds which are most difficult to acquire. There is a wide diversity in the facility of speech among children; some will stumble at sounds which to others will be quite easy.

The natural habits of children, so to speak, must be the key to their first instruction. A child begins to observe very soon after its birth; for the first two or three years its knowledge is almost confined to those objects which are evident to its senses; its methods of acquiring such knowledge are well worth consideration. The child sees an object, reaches towards it, grasps it, applies it to its mouth, endeavours to produce sound by striking it against a table, or anything else that is near; and thus acquires some knowledge of the properties of things, even before it can speak. By a process similar to this, different parts of knowledge may be conveyed to a child in a more advanced stage. When a child has learned to pronounce words, we may teach the names of those properties already familiar to him, and proceed to illustrate, to generalize, and to extend his knowledge by various examples.

For children from three to six years of age, we know of none so good as oral exercises on the names and

properties of bodies. The world of nature and art will furnish a never-failing supply of examples. Pictures will materially assist in such exercises; a slate and pencil will also help to amuse and instruct. Books, reading, and spelling, should not, in our opinion, be introduced at this early stage. Careful pronunciation, and correct oral language, should always accompany these primary lessons. Form, magnitude, weight, colour, number, sound, are the chief developments to be made during the infancy of the mind. Instruction in these may be imparted without books. Few situations are unfavourable to the growth and expansion of the youthful intellect by the analysis of objects; the rooms of a house, the garden, field, wood, road, will all supply materials well adapted for this purpose.

To explain the kind of lessons which it is proposed to substitute for the present very unsatisfactory modes of commencing a young child's education, the following examples are given; from which it will be seen that a person of very moderate attainments may both amuse and instruct a child of three or four years old.

"*Teacher.* What covers the floor of the parlour?—*Child.* A carpet. *T.* What colours do you observe on the carpet?—*C.* Red, blue, brown, yellow, green, &c. *T.* Bring me your slate. What shape do you call this? (drawing a circle.)—*C.* Round. *Other figures are drawn, and their names told to the child.* *T.* Now tell me the shape of the carpet?—*C.* It is oblong. *T.* What else in the room is oblong?—*C.* The windows, that table, &c. *T.* Which is larger, the carpet or the floor? Now look round every part of the floor.—*C.* The carpet covers the whole floor—the carpet is the same size as the floor. *T.* What is the small carpet called

which lies before the fire-place?—*C.* A hearth-rug. *T.* Yes. Are its colours like those of the carpet?—*C.* No. *T.* No; they are brighter and deeper. Now look well at the carpet—feel it—and tell me of what it is made. Is it made of wood?—*C.* No; it is not hard like wood. *T.* Is it made of leather?—*C.* No; it is not at all like my shoes. *T.* Of what are your warm socks made?—*C.* Of worsted. *T.* Yes, the carpet is also made of worsted; coats, cloaks, and other warm articles of dress are made of worsted—blankets also—and worsted is made of wool. And you know we get wool from—*C.* Sheep. *T.* I must tell you about the mode of making carpets when you are older.

"*T.* What are the men doing in this field?—*C.* They are reaping. *T.* What are they reaping?—*C.* Corn. *T.* What kind of corn is it?—*C.* Wheat. *T.* What other kinds of corn have we seen growing in the fields?—*C.* Barley, oats, rye. *T.* Wheaten flour is made into bread. When wheat is reaped, it is tied in sheaves, and these are left that the wheat may harden. It is hardened by the heat of the sun, and the dryness of the air. Some time after it is stacked in large heaps, called corn-ricks. Afterwards it is beaten with a flail to get the grains of corn out of the ears. This work is called threshing. Here is a grain of corn and this is an ear. There are many grains in one ear. After the corn is threshed it is taken to the mill to be ground, &c. Now tell me what is made of wheaten flour?—*C.* Bread. *T.* What else? Think.—*C.* Puddings, cakes. *T.* Why is wheat left in the field after it is reaped?—*C.* To harden. *T.* By what is it hardened? &c."*

* Should the attendant of the child be at a loss for subjects, or be unable, from a defective education, to invent such simple

These examples may suffice to show how much useful knowledge may be given to children before reading is necessary. During such a progress, the mind becomes enlarged, and capable of receiving real advantage from books, when it is thought desirable to commence reading. A child so trained will have a tolerable knowledge of the structure of our language, including all the ordinary forms of expression. It will surely be thought a greater advantage for a child to possess such a knowledge of things, and of language in which to express its knowledge, than for the time so occupied to have been spent in poring over primers and verse-books, learning what it could not understand, almost to the exclusion of that information thus pleasantly acquired, and so suitable to the capacity of childhood.

The writer is of opinion that reading should form no part of a child's employment until the mind, being thus trained, begins itself to seek for the means of drawing instruction from books; that, then, reading and writing should commence together; that a knowledge of things should precede or accompany a knowledge of words; and that the perceptive faculties should be the first to be instructed. In carrying this plan into operation, it will be necessary, first of all, to show the child that words represent ideas; that the names of objects may be written on paper or on a slate; and that the same ideas may be conveyed by writing as by the voice. A little practice, in a few words with which the child is familiarized, will accustom him to the association of

lessons as the above, much assistance may be obtained from Mrs. Trimmer's and Miss Edgeworth's children's books; at this early period the teacher alone should have recourse to works of this character—they should by no means be put into the hands of the pupil.

words and things. All the early exercises in reading should tend to draw out the child's previous acquirements. The lessons should be progressive, and every sentence contained in them ought to possess a meaning complete and intelligible.

The writer is altogether opposed to the difficult task of alphabetical instruction, whether pursued on the irrational plan of our forefathers, or on the certainly more natural modes which have been recommended in primers of a later day. Neither plan is necessary, and both are devoid of interest to a child. Syllabic reading is also surrounded with difficulties; and though much laudable ingenuity has been expended in the development of methods founded on syllabic sounds, with a view to supersede the A B C, evidence is not wanting that even such introductions to words are unnecessary. Many writers for little learners have claimed the patronage of the public for their monosyllabic lessons. We have several reasons to oppose to their views. There is a certain degree of similarity in many of the words which tends to confuse the child. An immense number of particles obtrude themselves into lessons so constructed. The words are not words used by a child in ordinary conversation. There is an objectionable stiffness, a quaintness, a want of variety in such lessons, inducing monotony in a child's manner of reading.

A child's reading lessons ought to be on subjects of interest, and, while he is learning to read, on subjects with which he is in some degree familiar; so that he may not meet with many expressions which are strange to his ears, and with none that he is unable to pronounce after his teacher. The advance from simple to more difficult lessons ought not to be founded on the

length of the words, but on the complexity of the ideas which they convey. Of what consequence is the length of a word if a child can pronounce it, and if he is acquainted with the idea so represented? And how large a vocabulary has a child, even under ordinary circumstances, whose mind has been under this kind of culture for four or five years. Supposing a child to have been trained at home, or at an infant school, in some such manner as has been recommended—when reading is commenced as an art, a lesson containing ideas well known to the juvenile learner should be taken. Let the subject be a garden. After telling him that he is now to learn to read, we write, in his presence, an exercise something like the following:—

"A flower-garden is beautiful. Flowers are pretty. Some flowers are sweet. A daffodil is yellow. Snowdrops are white. Roses are red—some roses are white. Violets are blue—they are very sweet. Leaves are green."

Two or three such sentences as the above will be enough for a first lesson. After a few repetitions, the pupil will point out every word required. The difference in the length of the words is an advantage. Words are arbitrary pictures; they express different ideas, and a child will naturally expect them to be not the same in their appearance. This dissimilarity will assist in their acquisition. And the perfect acquaintance which, on our plan, the child has with the ideas conveyed, and the pronunciation of the words which he hears repeated, leave him at liberty to devote both his eye and his mind to the form of each word. This is the one great end now to be accomplished. He has to remember the entire combinations—not the letters, nor the syllables

—but the *words*, so that he may recognize them at once whenever he sees them. To give facility and strength to this exercise, writing must accompany the reading of the words. The child transfers his reading lesson to his slate at first in any hand that he can, large or small. After a few lessons, his rude attempts at writing may be reduced to any size at the will of the teacher; a light round-hand is recommended for the first few months.

Something may here be said on the education of the eye. A plan which has been found very beneficial with young children, and which is equally suitable for the school-room or for the nursery, is as follows:—Let one of the walls be painted a dark slate colour, upon which objects may be drawn with chalk the size of life. Small pictures are not always recognized, while outlines of objects of their natural dimensions are at once perceived. Thus, also, the forms of the words composing any lesson may be written very distinctly, and imitated by the little learner, either upon the wall or by means of a slate and pencil. A painted surface is an enduring tablet for writing lessons upon, and for drawing any necessary illustrations connected with them; and thus the exercises of the pupil may be made to assume all the interest of oral and written language combined with delineation.

After a few lessons on a variety of subjects composed chiefly of short sentences, any book of general knowledge may be used in a similar manner, the teacher writing and pronouncing a sentence, examining the child upon the different words of which it consists, and occasionally leaving his pupil to write it upon the slate. During the writing operation, the teacher should not

only instruct the child in the use of the pencil, but he should also repeat the words of which the sentence is formed, and add explanations and examinations by questions, if the subject is beyond the child's previously acquired knowledge. Natural objects will furnish a fund of materials of which the teacher may avail himself in his selections of lessons. On these subjects every thing is tangible, and can be illustrated and made interesting. Geography is another subject capable of being rendered very intelligible to a young child, and the sooner some general ideas can be communicated upon this science, the better will the various reading-books that are put into his hands be understood. It will be in vain to attempt to teach geography without appropriate maps. The system of *memoriter* instruction is altogether wrong, being unfavourable to the expansion of the mind, and equally so to the cultivation of a taste for knowledge. In teaching geography, the simplest plan is to start from the point where the pupil stands, to mark his native town, the neighbouring villages and cities, then the country in which he resides; to add to this the neighbouring counties, then the more distant, until by degrees England is delineated, and the youthful student is prepared for comprehending the larger divisions of the globe, with its various features of land and water.

After the first hundred words, the pupil will be much assisted by his own observation; he will analyse words, and be led to generalize so as to apply sounds already learned to similar formations that he may meet with. The pronunciation that he has acquired in his earlier years will be now of the greatest importance in enabling him to see at once the distinctions between sounds possessing some similarity. The writing exercise, which

accompanies his reading lessons till he reads without hesitation, will show him the difference in words of a somewhat similar form and sound, as *now* and *how*, *noon* and *moon*.

Under ordinary circumstances, in families and in private schools, about a quarter of a year will be found sufficient for the instruction of a child in reading, spelling, (acquired by copying the reading lessons,) and plain writing. Under favourable auspices, where the plan can be brought into full operation, a shorter period may suffice. The characteristics of the proposed method are: —*the education of the ear and voice*, by which a perfect pronunciation may be recognised and produced: *the education of the eye*, by means of which minute objects shall be discovered and discerned, preparatory to its being exercised on types and writing; and the preliminary *education of the mind* on a variety of subjects, by which it may be prepared to enter the wider fields of knowledge, as soon as the teacher has recourse to the assistance of books.

With respect to *writing*, perhaps a few additional remarks may be necessary. We are not advocates for large writing; experience by no means recommends it for young children. It is impossible for them to give the requisite thickness to the down-strokes of a large-hand, and for this reason the middle-hand is preferred, commonly called round-hand. They may soon be taught the *arts* of penmanship, if necessary, but as the smaller hands are those of business and of ordinary use, the acquisition of a large hand occupies time which might be more profitably employed, unless fine writing be required. When the pupil has gone through a few of his first lessons, which have been copied from the writing of his teacher, the printed book containing his

lesson may be placed before him, the lesson being written for him to copy from, as at first: thus his eyes will be directed to the types, as well as to the written hand, and he will insensibly acquire the power of transferring what is expressed in types into writing, without giving his teacher the trouble of first copying it for him from the types into the written hand.

It may be remarked, that some part of the course here recommended is derived from Jacotot. The writer begs to explain that this coincidence is accidental. A short time ago he ascertained, with surprise, that such principles had been discovered, and made public. It was to a train of thought, originating in the study of Dufief's work on the French Language, that the principles here recommended were suggested to the writer. This, and some experience in the work of instruction, in ascertaining the powers of youthful minds and in giving them a direction, have led to the conclusions here detailed.

The applicability of what has been advanced to public instruction, especially to the education of the poor, is an interesting part of the subject. The children of the labouring classes go to school under less favourable circumstances than the children of the middle and higher classes. If they have not had the advantage of infant-school education, it would be well to form them into a preparatory class, before they are taught to read, in which they might be instructed in the names and qualities of objects, by means of pictures and other convenient illustrations. Perhaps such a class might be found useful in all the National and British Schools. In such a class, pronunciation ought to be carefully attended to, and every means taken to

exercise the eye, and to enlarge the understanding. Afterwards, reading may be commenced; the names of objects, animals, plants, furniture, tools, &c., being first conveyed to the pupils. Such columns of words will be found more interesting than the columns of spelling words generally met with in schools. These words will speak to the pupils of things with which they are acquainted, and in which they take some interest. The names will soon be known, and recognised, and written on their slates. A hundred words a day, well learned, will shortly give them a competent knowledge of the language, and the analogies, which they will not fail soon to perceive, will make their future acquisitions more rapid and easy. From the names of things, it will be proper to proceed to their qualities; *a red flower, a white flower, a black hat, a long pencil, a dry slate, a wet day*, &c. After the more common adjectives are exhausted, verbs may be taught; *a man mowing, a horse kicking, the cat catches mice, the horse eats hay, grass, and corn*, &c. Then it will be desirable to proceed to connected lessons, short stories, Scripture narratives, and the various other subjects connected with the work of a general education. Pleasing subjects should be selected, while the power of reading is being acquired. With all the interest which can be given to teaching reading, by means of factitious helps, it will still remain a difficult attainment for a child to make. But many of the evils which have been formerly encountered need be obstacles no longer. By methods somewhat similar to that now submitted to the attention of teachers, children may be made good readers in a few months, even under circumstances not generally considered favourable to the growth and expansion of the infant understanding.

ON THE SPELLING OF WORDS, AND A RATIONAL METHOD OF TEACHING THEIR MEANING.

BY

G. F. THAYER, PRINCIPAL OF CHAUNCY-HALL SCHOOL, BOSTON.

(Delivered before the American Institute of Instruction, August, 1830.)

THE subject on which I have been appointed to address you is, I am aware, when compared with many others, of inconsiderable moment. Still, it was thought to be worthy the attention of this association; and, in accepting the invitation of your committee to treat upon it, my duty to them and to you requires that it should receive all the consideration which its intrinsic importance demands.

I shall detain the Institute but for a very short time in this lecture, because its subject is one very simple in its nature, and not fairly admitting that scope which those of a more diversified character might seem to invite.

It is a matter of fact topic, which demands simple statements, rejecting all ornament and amplification. I shall, therefore, be brief, plain, and direct; and not aspiring to offer a single new idea on this branch,—lying at the very threshold of the temple of education,—to those who have ministered any long time at its altar, I shall hope rather to aid those who have been recently invested with its robes.

Experience would perhaps suggest to most minds seeking for improvement a course of teaching not dissimilar to that which I intend to present to you; but to save the time to the young teacher, and to enable him at once to avail himself of the experience of others, that the progress of his pupils may not be retarded while he is acquiring a personal knowledge of his art, cannot, as it appears to me, but be a desideratum.

Correct spelling I shall assume to be *necessary;* 1. because on that, in a degree, depends our understanding of written language; and it would not be difficult to show, that, in a language like ours, derived from so many sources, the very opposite idea from that intended to be conveyed may be expressed by the omission or transposition of a single letter.

2. Although correct spelling is more rare than a thorough acquaintance with the sciences, still every man is a critic in it, and inflicts the penalty of ridicule upon those who transgress its rules.

3. It is important in the education of the young, as it leads to habits of accuracy in other things in which the want of accuracy might be far more fatal to our own interests and happiness. He who is exact and careful in trifling affairs, seldom, if ever, fails to be so in more momentous concerns.

4. The state of literature generally, and especially the estimation in which thorough education is held, may be inferred from the correctness or inaccuracy of the manner of spelling a language.

5. Good spelling is essential to the permanency of a language. By this alone are we able to trace many words to their etymology, without a knowledge of

which,—although we may understand their current use, — we may be entirely ignorant of their signification when originally adopted into our language, and consequently fail to enjoy the authors of past times.

6. It is also important as it respects the effect of our works on nations speaking other languages, both as to the convenience of foreigners in learning the English, and especially as it relates to translations into other languages, in which the author's fame and a nation's improvement may be implicated.

Some men of rare genius have, it is confessed, delighted the world with their sublime conceptions and harmonious numbers, or illuminated it with the results of their philosophical researches, or dazzled it with their metaphysical speculations; though, from neglect in their primary education, they have been very defective in the elements of their native tongue. But this offers no plea for neglecting to acquire a correct orthography. Their mental achievements were not the result of this deficiency; and however the splendour of the works of genius may have obscured or hidden their defects for a time, we are compelled to admit them as defects, and hence to abate some portion of our estimation of the authors.

Having established the utility and necessity of correct spelling, I proceed to point out what I consider the best means of conferring on the young so desirable a benefit.

Being chiefly an exercise of the faculty of memory, it should be one of the first studies undertaken at school; and should be persevered in, with unremit-

ting constancy, till unfailing accuracy crown the labour.

It is a great mistake to permit the higher branches of learning to supersede this, before it be thoroughly acquired; for, if it be not attained in the first few years of school education, the individual will probably remain deficient in it through life.

Numerous as are the innovations in, or, to adopt a more acceptable term, new methods of, teaching the various branches of education, at the present day, I hold those only to be *improvements*, which present the subjects in a more practical form; which will require the least change from the school method to that to be pursued in the business of life.

If, then, we look for a moment at the common mode of teaching spelling; viz., to assign one or more columns of words in a *spelling book* to be 'committed to memory,' and uttered by the voice, letter by letter; we see one entirely at variance with practical instruction, tedious to the pupil, expensive in time to the instructor, and *never to be used in after life;* of course, one that needs reformation, and in relation to which almost any change would be an improvement.

A preferable course would be, to assign a portion in the reading book of each class, to be written on slates to dictation, and subsequently examined by the teacher or monitors, who, after checking any errors that might occur, should return the slates to their respective owners for correction—by the book, or otherwise.

By this method, a whole school may be simultaneously engaged in the exercise, and a hundred pupils, in five distinct classes, may write twenty words each, in

fifteen minutes or less—every class from its respective reading book—the teacher naming the *number* of the class, with its respective word to be written, and passing on to another class; so that, by the time five words have been given out to as many classes, the first of them will be prepared for another word.

And here let me urge upon the teacher the indispensable necessity of a *perfectly distinct* articulation, especially as to the vowel sounds. Without it, the pupil will often misunderstand the word, though several times repeated; and with it, he is able not only to understand the word at its first announcement, but catches from his master that clear enunciation and correct pronunciation which constitute the clearness and efficacy, I may say the great charm, of spoken language. If this be neglected, and the word be uttered in that careless and slovenly manner which we too often hear, even from teachers themselves, no censure should attach to the scholar, how numerous soever may be his errors. For example;—let the word be *disposition;* let it be pronounced, as it is in a majority of cases, *disp'sition* or *dispusition*, and I defy any man to say, at once, which of the five vowels would best supply the doubtful syllable.*

If the school under my own care has made proficiency in anything, it is in this department; and I attribute it not more to the general method of teaching pursued by

* A little work, entitled "Lessons in Enunciation," by William Russell, has recently been published, which presents the current errors in pronunciation and articulation in so distinct a view, as to be highly valuable to teachers and all persons of taste in these branches of elocution. Teachers of reading, especially, would derive important aid from its rules and suggestions.

us, than to the great exactness in the mode of pronouncing, and the invariable rigidness with which a clear and distinct articulation is exacted and enforced.

If the pupil be required, after correcting his failures, to transcribe the words missed, into a book kept for the purpose, he will be less liable to repeat the errors when the same words shall again occur, and will, in time, have made a collection of those that require his greatest care in their application, and which might, in themselves, furnish profitable lessons for review.

In this connexion, I would suggest, that the transcribing of good composition, besides aiding to furnish the mind with various other knowledge, is of essential service in fixing, by habit as well as by memory, correct methods of spelling.

In spelling lessons, at first, the pupils should be required to write every word containing as few as *two* letters; but as they advance, the more difficult words only should be selected. In this selection, the attentive teacher will soon be led by his own experience to perceive, that it is not the *longest* words which scholars are most liable to misspell, but rather those that are common in sound to many others in the language, of a different combination of letters: such, for example, as receive, believe; compeer, cohere, grenadier; the verb *hear* and the adverb *here;* the pronoun *their* and the adverb *there;* a regular noun in the nominative or objective case plural, and the possessive case singular; participles of regular verbs, in which a doubt may exist whether the consonant preceding the final syllable be double or not; as in committed, benefited, &c. Also, in words where *able* is added to *c soft*, as in *peaceable*, and to *g soft*, as in *changeable;* in words beginning with

in and *en*, as inquire, enclose, indorse, entrap; in words ending in *er* and *or*, as instructer, preceptor, visiter, sailor.—Many of these have been thrown into distinct exercises in spelling books, and may, with much advantage, be learned by pupils at a very early age; a recurrence to them, however, as they may be met with in the reading book when used for spelling lessons, will always be found useful. Some of Murray's rules, as given in his book of Exercises, especially the fifth, ninth, and tenth, would afford much aid; although the exceptions are so numerous, as to forbid an implicit reliance upon them.

Besides these *classes* of words, there are many of irregular formation, which are more frequently spelt wrong than right; among these are the following—wagon, pony, balance, saddler, wo, ay (meaning yes), basin, buffalo, expense, absence, melancholy, lily, ennoble, possess, disappointment, recommendation, until, off (adverb), oblige, trousers, separate, too (adverb), college, &c.—To these may be added several proper names of persons, such as Catharine, John, Eleazer, Eleanor, Jesse;—and of States, such as Louisiana, Pennsylvania, Mississippi, &c.

I have said the lessons in spelling should be given from the *reading* book, for the following reasons; 1. most spelling books contain many words which are seldom found in English composition, hard to learn, and almost useless when learned—to the exclusion of simple, common, and consequently useful words.

2. Few spelling books, if any, are adapted to the capacity of very young children; but in general, excepting a few of the first pages in the book, are made up

of long and difficult words, much above the comprehension of the scholar.

3. They are, for the most part, so encumbered with notations for accent, pronunciation, &c., that although the teacher may be aided by them, the pupil is perplexed and embarrassed.

The department of reading books, on the contrary, is very fully supplied with such as would meet the wants of every class of children; especially in their primary instruction. A difficulty, however, exists here, and one, too, of no trifling consideration. The compilers of these reading books spell certain words very differently. We find in some, positive errors; here, an author, whose books is perhaps in the hands of your youngest class, adopts the orthography of Perry; there, is a book used by your next class, which follows Johnson; another takes Walker for his standard; and a fourth varies in some points from all three; while a fifth, professing to follow rigidly the most *fashionable* guide, either from ignorance or carelessness, deviates most widely, in many cases, from his own criterion; besides, spelling the same word variously in different parts of the book.

It is true, an attentive teacher may meet the evil by oral explanation and remark; but while the pupil has the printed guides in his hand, he must inevitably be confused, in many instances, by the inconsistency he discovers. Besides, in numerous cases, instruction in the department of spelling must be entrusted to the elder scholars; in monitorial schools almost wholly so. Hence, very imperfect instruction will be the result.

Among the good reading books, in use with us at the present time, are, the American First Class Book, the National Reader, and the Introduction to the National Reader, all by the same author, who has not only compiled them with very great care and taste, as to the style of the compositions as well as to their moral tendency, but who has given more than ordinary attention to the spelling of the words; so that they form a series for three classes, containing as few variations from the standard assumed—and that the most popular among us at the present day—as can be found in any other three books in the language. In the spelling of some classes of words, which I shall have occasion to advert to hereafter, I should not perhaps adopt the same rule which he has adopted; but as they are few and very distinct in their character, the variations can be easily explained, and remembered by all pupils sufficiently advanced to use these books.

The same gentleman would render the cause of education a service, by continuing his labours, until all classes of pupils, from the oldest to the youngest, should be supplied with books for reading and spelling, from one source—by which a uniform standard might be observed throughout.

The wishes of those teachers who might be unwilling to forego the use of the *spelling* book, could be attained by a series of books, prepared with reference to each particular class; beginning with one containing the alphabet and such simple words as the child himself would naturally understand and use, and advancing, by very gradual steps, in several separate books to the most difficult words in the language.

The words to be spelled might first be embodied in interesting stories, and afterwards arranged in columns, —in the manner of Worcester's Primer,—which, presenting them in two different aspects, would make a more permanent impression on the memory.

Several advantages would arise from this plan; 1. the various books would necessarily be quite small, and a child could entirely master the contents of each before it would be worn out; which is far from being the case with the spelling books now in use. Hence the plan has economy to recommend it.

2. The pupil's advancement would be much more agreeable to himself, and consequently more rapid; as he would *travel in the light*, comprehending all he learned. He would be stimulated to effort, by passing onward from book to book, as he would realize a promotion at every change.

In the use of the spelling books now in our schools, it becomes necessary to *review*—to pass them through several times; and after all, the lessons are not retained, for the pupil becomes tired of the book; he has used it too long; it has been a dull companion to him. He never studies it the second or third time with the same spirit as at the first; whereas, a new book is taken up with an eagerness and freshness that the novelty of it inspires, and produces proportionally increased benefit.

Another advantage will be suggested, when I come to speak of *defining* words, which was a subject connected with that of spelling, assigned to me by your committee.

Were spelling books, such as have now been recommended, once introduced, I am not sure but that the

advantage would lie on their side, even when compared with books exclusively for reading. One superiority they might be made to possess, especially with the younger classes; I mean that which would arise from methodical classification of words. By arranging the lessons analogically, the manner of spelling would be more easily learned, and on the mnemonical principle longer retained, than if taken up promiscuously. Still, I would not have the lessons entirely unaccompanied by exercises from the reading book. And from what book soever or by whatever mode they might be *studied*, the *evidence* of the study should, in all cases, be rendered *in writing*.

On this point I would venture one general remark; which is, that in all branches susceptible of it, the exercises—the results of study—should be presented to the *eye*, as the best organ of communication with the mind. Whatever is acquired through this medium is better retained than when entering through any other. It may be said, *the eye remembers*. It is more *attentive* than the ear. Its objects are not confused. It takes in a single and perfect image of what is placed before it, and transfers the picture to the mind. Hence all illustrations in our teaching, which can possibly be addressed to this accomplished organ, should be so applied.

The mode of performing orthographical exercises now recommended, is not, it will be observed, a mere substitution of a more expeditious and effective method of accomplishing a spelling lesson. It implies the adoption of a different principle of operation from that which generally prevails. It proceeds upon the great principle of calling the mind into action in a

practical and useful way, instead of one which is arbitrary and mechanical. It demands of the pupil, not a mere listless attention, or a transient effort of recollection, but an active exercise of his powers, such as corresponds to the occasions of business in after-life. The senses, even, are employed, and the perceptive power in young minds is so slight and evanescent, that such aid is to them indispensable. Attention and memory are made to keep pace, in such forms of exercise, and it is the dissolution of their natural connexion which, in any case, gives rise to errors in orthography. What is needed in this department of instruction, is, that the pupil have prescribed to him such forms of exercise as shall prevent that mechanical and abstracted attention, which belongs appropriately to a higher stage of his advancement—that in which memory, having become perfectly true and faithful in its office, the power of attention may be safely permitted to glide into a comparatively dormant or unconscious state.

One of the great intellectual benefits of instruction in this department is to keep the mind in wakeful, voluntary, and efficient attention—a result which can be attained only by practical expedients. The usual mode of performing spelling lessons fails entirely in this respect, and indeed much of the pupil's success in it depends on an inactive state of mind, in which all the faculties are merged in an arbitrary flow of memory. Practical methods of instruction, involving the co-operation of our pupils themselves in all that we require as exercises or lessons, have in all cases the recommendation, which, though not always a primary one, is, nevertheless, important in a high degree—I mean

the immediate happiness and cheerful diligence of the young. The prevailing method of managing lessons in spelling is commonly attended with a comparatively dull and languid state of mind, which contributes, along with other things, to render school exercises listless and wearisome. The effect of such states of feeling is to be dreaded, not merely because it is less favourable to immediate improvement, but because it tends to entail on the mind habits which are injurious to its powers, unfavourable to their free and generous development, and at the same time silently destructive of that freshness and vigour of corporeal sensation, which is indispensable to happiness in youth, and to habitual activity in manhood. All exercises in every department of education should, as far as possible, be of an active, and not of a passive nature.

Organization, we have heard, bespeaks a design for action.* This should not be forgotten, even in those employments which are purely mental; and perhaps we should find less injury resulting to health from school education, were school exercises of an active and enlivening nature to an extent which is easily practicable. It is perhaps too true of all the stages of education, from the lowest to the highest, that they are planned with too much reference to a recipient and passive state of the mind; that they presuppose and demand *inaction* as a matter of habit, and thus tend to produce a mental character, which, although it may be of occasional advantage in a given branch of study, is precisely that which is not required in the business of life, nor in those stages of intellectual pursuits, in which the student is required to advance for the purposes of discovery and

* Vide Dr. Warren's Lecture on Physical Education.

invention, carrying with him all his energies in full and constant activity.

I may be pardoned, I hope, this brief digression; for it is of inexpressible moment, that, in the whole course of education, and especially in its elementary departments, and in its operation on the susceptible faculties of early life, we should keep a constant eye on the probable *result* of all our methods, and their influence on mind and character. In the humble routine of the daily exercises of school, there are principles at work on the intellectual habits of the young, which may give a colour or determination to the whole mental being; which may lead to intelligence, moral purity, and happiness for life, or to results of the opposite character, and as lasting in their effects.

The existing diversity in the modes of spelling English words, each defended by high authority, will present to the young teacher—who may be desirous of escaping from the shackles of local custom, and establishing for himself a standard independent of considerations so narrow—much perplexity. Especially when he perceives that fashion is as fickle in this matter as in any other. In this dilemma, I would recommend to him to adopt the style that is *coming up*, rather than that which is *going down*. Johnson's authority is perhaps better than that of any other lexicographer,—but in several classes of words his mode of spelling has had its day and has become obsolete.

Many of the writers of this metropolis and vicinity have adhered to the *k* in the terminations of polysyllables, as in *musick*, *ecclesiastick*, and the like; and to the *u* even in words like *errour*, *terrour*, &c. until,

in this respect, they stand alone, or nearly so. Most of the accomplished writers of our own country and in Great Britain have dropped the *k*, and very many the *u*, in these two classes of words. The best periodicals in both countries have done so; and it is plain to perceive that this mode will eventually prevail to the exclusion of the other. I consider it the *improved* mode, because any method which tends to simplify, without doing violence to etymology or the genius of our language, is a decided improvement.

The letter *s* is also taking the place of *z*, in words having the *z* sound, and so continually is this change going on, that one can hardly decide which is right *to-day* from knowing what was so *yesterday*. The best periodicals incline to a very general use of the *s*, although there are still many exceptions, and—as a foreigner must be led to think—much caprice on the subject. For, what good reason can be offered in defence of the practice of spelling surprise with an *s*, and apprize with a *z*? Some have ventured to drop the *z* altogether, in words of this class, and even in words like organization, to substitute the *s* for that letter.

This fluctuating state of things existing, and there being good reason to believe that the changes enumerated will become general, both as it respects the pronunciation of words and the new mode of spelling them, —why should not we attempt to effect a uniformity at once? Why should not this Association fix for itself and its members some mode of spelling—especially as it regards the classes of doubtful words above alluded to —which we would be willing to use, to teach, and defend? If the mode were a good one, we might hope

to have it generally adopted in our country. And by publishing a cheap manual on the subject, the variations might be easily placed within the reach of all who fee any interest in it.

It seems to me that we could hardly do the community so acceptable a service, with so little labour, or make one of the subjects of primary education more simple, with so little inconvenience to ourselves. The public are not tenacious of particular modes of spelling. With few exceptions, no prepossessions exist. They wish for *consistency;* they desire to find the English language the same, wherever written or spoken. They need only a responsible leader in the matter. They ask for some standard—some authority,—and if that standard be respectable, that authority worthy, they are willing to be guided by it.

Who then shall constitute that standard? Are any more naturally so than men of education engaged in the profession of educating others? If teachers are what they ought to be in this distinguished office, they are most competent to decide on the question under consideration. I hope they will decide it for themselves, whether the community at large acquiesce or not in their decision.

I cannot, without injustice, omit to mention, in this place, the name of NOAH WEBSTER;—a man who has devoted more time, labour, and profound research to the English language, than perhaps any other man who ever studied it. Twenty-five years—the most vigorous in mental power, of his whole life—given to an examination into its genius, structure, etymology, and current use among the best-educated persons who speak it,

having stored his mind with a fund of the most valuable information on the subject, invest his opinions with a claim to consideration beyond that of most other men of this or any other age.

The result of his labours is the voluminous and excellent dictionary recently published by him, which, as far at least as any other now known, deserves to be adopted by his countrymen as the standard of orthographical accuracy. For, although many innovations have been admitted into it by him—some of which being peculiarities of his, we could have wished he had suppressed,—yet a large share of them must be deemed positive improvements, and as such we may hope ere long to see them come into general use.*

On the subject of defining the words of our language, my opinion is, that the only effectual method of doing it with young pupils, is, 1st, by oral explanation during a lesson in reading or recitation. And no word should ever be passed over, from the first of a child's reading in sentences, without his comprehending fully and distinctly its meaning. For which reason, I am the more in favour of the kind of books—before alluded to—resembling Worcester's Primer, by which the pupil's interest in the story comes to aid him, and renders the teacher's assistance more seldom necessary. If these

* Since the delivery of this lecture, Mr. J. E. Worcester of Cambridge has given to the public a Dictionary which is better adapted to the wants of the American community in general than any we had before seen. It contains 43,000 words, is very neatly printed, and brought within the compass of 400 pages. It has an appendix containing copious vocabularies of scripture and classical proper names, with their proper accent and pronunciation; and a collection of most of the words of doubtful orthography in our own language. It is admirably calculated for the most advanced pupils in our schools, and is highly worthy of general attention.

stories are illustrated by drawings, the advantage is increased, especially in the first two or three books of the series.

2. When the reading lesson, accompanied by all the necessary explanations, shall have been completed, the pupil should be required to define to the teacher such words from the lesson as may be given to him, and subsequently to write them on a slate for a spelling lesson; if he be directed to write the *meaning* also, so much the better will it be for his progress in the language.

3. The next exercise I should recommend would be a paraphrase of the story, in the pupil's own language, according to his understanding of it; by which the teacher could ascertain whether he had a correct idea of the whole, as well as of individual words, and also furnish a good opportunity for laying the foundation of the scholar's style.

This exercise would, with the aid above suggested, be found a very agreeable one to the pupil, who would, in no long time, be prepared for the use of the dictionary. This might be first put into his hand as soon as he should be able to distinguish synonymes. Until then, for the lesson in question, he had better be without one.

4. The teacher now having marked in the reading lesson such words as he deemed most suitable and useful, the pupil should seek in his dictionary for such as could be substituted for them, without changing the import of the sentence; when he might either write the original words with their synonymes on a slate, or *read* the latter in lieu of the former—incorporating them into the sentence.

This practice, continued for a while, prepares the

scholar for reading with unhesitating fluency the supplied synonyme for the original word, in the same manne that a good linguist translates a language at sight, and looking on a page of French—for example —reads it in correct English.

A sure and satisfactory method of ascertaining that the pupil has acquired the *meaning* of every word along with its *definition*, and to invest him with the highest and most important benefit arising from this exercise, is to require of him to embody every word he is asked to define in a sentence of his own composing. Such exercise, it is hardly necessary to observe, calls into action all the resources of the mind, and produces a readiness of thought which is an invaluable acquirement.

It is not to be expected that the pupil will accomplish all this without many failures and much occasional aid from the instructor, but every step of his progress will tend to make the next more easy, and will, besides giving him a correct understanding of the subject of the lesson before him, lead him to observe those nice shades of difference in words and expressions, without which he can never write his native tongue with purity and precision.

These methods of teaching spelling and defining are not merely theoretical. They are the results of positive experiment, practised under my own superintendence for eight or ten years. And as far as my opportunities have enabled me to compare results with those of other methods of teaching, in these departments, I am satisfied that such as have been recommended,—if not the *only true* ones—are of that practical character without which all methods must be useless, if not worse than useless.

I have said nothing of the practice, once so common, of assigning lessons in spelling and defining from the columns of a dictionary, sweeping through the whole, from the letter A to the last word under Z,—if the pupil continued long enough at school to accomplish it,—for I cannot suppose it to have come down to this day. If it had, however, I should feel impelled to pronounce it one of the most stupid and useless exercises ever introduced into a school—compared with which, the "committing to memory" indiscriminately of all the pages of an almanac would be agreeable, beneficial, and instructive.

To say that it would be impossible to remember the definitions thus abstractly learned would be to assert what must be perfectly obvious to every one. And even if they could be remembered, they would be of little utility; for as the right application of a definition must depend entirely on the situation of the word to be explained and the office it performs in a sentence, the repeating of half a score of meanings as obscure perhaps as the word itself conveys no definite thought, and serves rather to darken than illuminate the mind.

As a book of reference a dictionary is useful; although, it must be confessed that, even with the best, one often finds himself obliged to make his own explanation, in preference to any furnished by the lexicographer; and the teacher or the pupil who relies exclusively on his dictionary—without the exercise of much discretion—for the definition of whatever words he may find in the course of his studies, will not unfrequently fall into very awkward and absurd mistakes.

Experience and common sense must lend their aid—the former to teach us what is practicable; and the

latter, what is appropriate and useful. And the teacher who has the improvement of his pupils and the great interests of education generally at heart, will not content himself with what he has already attained, but be perpetually striving to add to his stock—by however small degrees, and in however insignificant departments—whatever may make him more accomplished in his profession, and consequently more worthy of the charge entrusted to him.

ON TEACHING BY PICTURES.

By G. LONG.

(From the Quarterly Journal of Education, No. XVI.)

We have had our attention directed to this subject by the following statement:—

"I write as you desire, to give you some account of my little nephew, who is now just two years old. He is extremely fond of pictures, and has been in the habit of amusing himself with the wood-cuts in the 'Penny and Saturday Magazines,' and other books within his reach, occasionally asking about what he sees. For several months he has been able to name, and distinguish, by form, every animal, plant, statue, and portrait in the first volume of the Penny Magazine, every thing, in short, but some of the ruins, churches, and buildings, which he passes, saying he does not like them, probably because he does not understand what they are. I think he prefers the heads of celebrated persons, and the animals, to any others, occasionally making remarks (where he has received information) upon the character of the former, and without information on the action of the latter, such as "Dr. Johnson, very rude man; Isaac Newton, not Isaac Walton; Isaac Walton, a fisherman, &c." The last time I saw him, he showed me the engraving after one of the Cartoons, when he pointed out to me by name, first Christ, then Peter, (remarking that he was kneeling with the keys,) and then several other disciples, Matthew, John, James, and Judas; nor was he to be misled by my asking him about the last mentioned first, as he evidently knew and remembered their

faces and attitudes. He distinguishes perfectly between the Portland and Warwick Vases, so that I believe if he were shown either of these vases he would immediately name it. The other day he met with a tea-urn for the first time, and immediately named it from having seen a picture of one in a child's book. I think his knowledge of the plants, statues, and portraits, the most remarkable; of the two latter subjects I suppose there must be nearly forty, and as the style of their execution and their size are so nearly the same, he could have nothing to guide him but his knowledge of their faces. In one case, where the shadow was badly placed, he remarked that he 'had a dirty face.' No pains have been taken to teach him this. All the information which he has received has been in answer to his eager questions; and it may be said, that he has in fact already made some progress in the knowledge of zoology, natural and sacred history, biography, and botany, entirely from the use of pictures."

If we consider how largely pictures contribute at the present day to give impressions to children, and to communicate either knowledge or error, but more frequently the latter, we shall think the subject worth a little consideration.

Next to the impressions produced by real objects, pictures are in early life the fruitful sources of ideas. A child reads a picture long before it reads a book. The mode in which a child gradually acquires the true interpretation of the objects presented to its eyes is not very easy to trace, because the acquisition of this practical knowledge begins with the child's existence. We see, however, that a child, as soon as it has the use of its arms, calls in the aid of another sense to help its im-

pressions of visible objects: every thing that a child sees it wishes to handle; and any object that it can handle is carried to the mouth, where it undergoes a new kind of examination.

The meaning of a picture, even a mere outline, is soon understood by a child when the reality, or something belonging to the same general class as the reality, has been seen: if neither the reality nor anything belonging to the same class has been seen, a picture conveys no meaning to a child, nor indeed to a man. A picture of a thing which is altogether new and unknown, and the thing itself, are at first sight equally unintelligible.

How does a child know that a few lines scratched on a piece of paper are intended to represent some particular object, or some object belonging to a class? We can only answer this by considering what that is by which we know that a picture is a representation of some definite thing, or some thing belonging to a definite class of things. Colour in the first place is not necessary: a man's profile or the figure of an animal may be cut out either in black paper or white paper, and in either case the object may be immediately recognised. Much less is it requisite that every part in the object should have something corresponding to it in the representation. A few strokes arranged in a certain way convey the idea of a man, a bird, or of any class of objects with which we are familiar: a few strokes are sufficient to point out even individuals of a class, if the person who is to judge of the picture is well acquainted with the individual object represented. We often know a person by seeing only a part of him; a glance at part of his face, or a view of his back, is often enough. It is then the form of a thing which

enables us to recognise an object, or its representation; but what is the form, and how much is it? It is not the form of each part, though each part, when accurately represented, tends to confirm our recognition of a thing in which each part is already known to us. This is the way that a naturalist looks at a drawing of any object, or an antiquary at a coin or gem: he tests and examines his first and general impression by a careful inspection of the minuter parts of the object. A single glance enables us to know many representations of objects, whether they be intended to represent any one of a class or some particular one of a class. It is clear, therefore, that the notion of a resemblance is very rapidly produced. The general form of a real object, as presented to the eye, consists in the boundary lines of this object: for instance, the forms of large buildings are often projected on the sky, and at certain times in the twenty-four hours and in certain states of the atmosphere, they show themselves in a surprising angular and distinct form. There is no real difference (as to conveying the general impression) between the boundary lines of objects thus presented to the eye, and other lines drawn in proper positions and proportions on any plane, such as a flat piece of paper. These lines, when drawn in their true positions and proportions, on any plane surface, are as complete a reality as the object itself, and convey as exact an impression as the *general* impression of the real object: it is true, that if we begin to look to minute details, the appearance of a real object and the outline of a picture are not the same thing; but we are speaking of an outline picture, which does no more than present the general character and the most marked or distinctive particular characters

of objects; and for this purpose an outline is all that is wanted. We make these remarks, because we have heard it said that children do not understand outline representations. There may be some children who do not, because there are some unfortunate children who hardly understand anything: but, as a general rule, children do understand outlines, even their own clumsy imitations of men or quadrupeds, which they make to amuse one another with frequently long before they have learned to read and write.

The low rate at which tolerably good copies of most objects can now be procured, owing to improvements in wood-cutting and in the whole machinery connected with printing, renders it an object of great importance to consider how far these improved arts can be made useful in education. Every body will readily admit that accurate representations of many objects are essential to the right understanding of what we read: they are as necessary accompaniments to treatises on many branches of science or art, as maps are when we study geography or history. To children they are a never-failing source of pleasure, and they may be made powerful instruments for the communication of useful knowledge. We will mention a few classes of objects which may be usefully represented in children's books; they are classes about the propriety of which there can be no dispute, provided the representations are correct.

Objects of zoology—such as quadrupeds, birds, fishes, &c.

Objects useful in the mechanical arts, or objects the products of the mechanical arts—such as various kinds of instruments and implements, machines, &c.

Objects historical—such as views of edifices known in

history, views of places associated with historical events, likenesses of distinguished persons; representations of the different forms of the same things at different epochs, such as costume, ships, military weapons, &c.

Other classes of objects may be mentioned, of which representations will be useful and pleasing, such as views of striking scenery in all parts of the world, especially when such localities are connected with historical events. We may here mention a recent publication of this class, which in its scope and design is calculated to give both pleasure and instruction. The Landscape Illustrations of the Bible* contain views of the most remarkable localities in Palestine, accompanied with a short letter-press description and a reference to authorities. As specimens of engraving, the views are more highly finished than would be necessary in any similar work designed to be extensively distributed; though these engravings cannot by any means be called dear. Of the value of such illustrations applied to those countries which have been the scene of many remarkable events, there can hardly be a difference of opinion; and this value is increased when these views are characterized by such striking natural features as those of the mountain-regions of Syria. The value, however, of such illustrations depends altogether on their accuracy; if they do not possess this essential quality, we would rather be without them. In the work just alluded to, the names of the draughtsmen are given, which is as much as we can reasonably expect. There is, however, some suspicion, perhaps often groundless, that the rough sketches of travellers are frequently embellished before they are presented to the public. The reading com-

* Publishing by Mr. Murray, Albemarle Street.

munity, however, is as much to blame for this as any body else: they have not in general sense enough to prefer a true rough sketch to a finished picture which contains details that will not stand the test of criticism. Few publishers now would venture to send out such homely cuts as we see in Niebuhr's Travels, and other good works, and yet many such drawings, though positively ugly, have been found to possess great merit for fidelity.

This style of illustration, which has been applied to the Bible, has also been extended in some recent publications to many of the most remarkable localities in Greece and other countries. Still much remains to be done in this department. We can imagine nothing which would contribute to give so strong a charm and so vivid a reality to many passages in Greek and Latin writers, as a familiarity by good pictures with those remarkable spots where nature still continues to be the best and sometimes is the only trustworthy commentator on the text of the ancient historian.

The Gallery of Portraits, published by the Society for the Diffusion of Useful Knowledge, is one of the best and cheapest attempts to make pictorial illustration contribute both to amusement and instruction. But the value of this series, as every one feels, lies in the real or supposed truth of the original portraits from which the engravings are taken.

Of late years it is surprising how much we have added to our clearer conception of ancient history by improved maps, and by plans and views of the most remarkable sites of antiquity. We think it will not be denied that the classical studies of our youth would gain in distinctness and in attraction by increasing as much

as possible all aids of this kind, which unfortunately, till within a few years back, had fallen almost into disuse. Yet if we look into some of the old editions of the Roman historians, such as Florus, by J. G. Grævius, we see that the commentators of that day did not consider such aids as useless. They give us copies of medals (rudely enough drawn, but still not without their use) which belong to the personages mentioned in the text, or commemorate some great historical event, and confirm the general statement of the historian by the least doubtful of all evidence that we can have. At the present day it is almost needless to observe, with what superior accuracy and at how much less expense such illustrations can be published for the use of schools.

Pictures are useful for the instruction of children, when the objects represented belong to that class of things which are worth knowing, and when the representation of them is strictly correct. What objects are worth representing cannot be determined exactly, for many obvious reasons; but we shall endeavour to approach to a determination by considering some kind of objects which it is not useful to represent. It is not useful to give to children any representations which tend to mislead them, or to deceive the understanding; nor is it useful to give them pictures which tend to excite thoughts and associations that have a bad effect on the moral character. Neither of these two propositions perhaps will be disputed as thus generally laid down: but on the former much difference of opinion may arise, when we come to analyze it, and we shall therefore pass it over now, and make a few remarks on the second proposition, about which there can hardly be any difference of opinion.

No prudent parent would treat his children with the weekly entertainment of "God's Revenge against Murder;" a London publication which contained accounts of notorious offences against human life and representations of the chief circumstances, which were generally some shape of atrocious murder. Such pictures and publications do no harm to a mind already formed by reflection and education; for it turns from them as from any other object the contemplation of which gives no pleasure. But children and the uninstructed, such as servants, who are often children in understanding, feed greedily on such food. If there were no other objection to it, there is this, that it occupies the mind to the exclusion of other and better things; but besides this, it produces a feverish excitement, with indefinite ideas of fear, and makes the mind dwell on acts and associations which it is better to banish from our thoughts as much as we possibly can. Parents are not sufficiently cautious how such edge-tools are handled by children. A short time ago there appeared in the London shop-windows a penny picture of the devil, with a pair of horns, tail, fork, and other suitable appendages, carrying off a number of the leading political characters of the day, in whom, according to the ingenious draughtsman, this personage is supposed to have a peculiar interest. This picture, ridiculous as it was, worked its effect on a child within our knowledge, and caused much misery and some sleepless nights. At present it is difficult to prevent a child from seeing such absurdities, and after all, the mischief is not in most cases of a permanent character, though we are much inclined to think that it sometimes is; but there are parents who unwisely give their children such

trash to feed upon, when there is better food in the market.

Indecent prints are the most demoralizing of all the forms that the imitative arts can take. No parents give such pictures to their children, but they cannot always prevent them from being seen, because they often appear in shop-windows, at least in London. The mischief which such prints cause depends on the age and temperament of the spectator: that they do much harm in many cases is notorious. An efficient system of police might possibly check the appearance of such prints in windows, though the question between the boundary of decency and indecency would be often violently disputed. With such kind of prints, however, we have no further concern here, than merely to say that they, as well as those mentioned just before, belong to one large class, which comprehends all prints of all kinds that tend to fix in the mind either false fears or false desires. By fears and desires that are false we mean, as to the first, fears which are an indefinite apprehension of some evil, but are not fears of that class which tend to determine conduct in the right way; as to the second, we mean such notions of present or future pleasure as are not founded in truth, and are proved by general experience to cause misery and not happiness.

According to these principles we object to many prints, which appear in religious books, such as representations of the torments of the wicked in a future life; for, though it has been declared that the wicked shall be punished, we do not know the precise mode of the punishment, nor can we, without a gross act of folly, attempt to represent such subjects. On these principles we object also to some of the illustrations which appear

in such books as Mant's and D'Oyley's Bible, though they are all taken from pictures of various degrees of excellence. None of these illustrations, however, are so absurd as some which appear in the older Bibles, and in various books of devotion. Our objection to most pictorial illustrations of this class is, that they are bad for children, because they are either not the representation of a truth, or because they attempt to represent something which cannot be represented; whether or not they are good for older people is not now our business to inquire.

The first proposition laid down was that children should not see prints which tend to mislead or deceive the understanding: the rule may be a very good one, but a wide diversity of opinion may arise upon the interpretation of it. In a recent Number of the Journal of Education (No. XIV. p. 246), a set of historical pictures was recommended as a useful means of fixing great historical events in the memory, and it was there remarked, that 'Correctness of costume in such prints, or good taste in the drawing,' however desirable if they can be easily obtained, are of very subordinate importance.' From this remark we entirely dissent: to us such a principle appears likely to be productive of so much mischief as to render null whatever good there may be in the rest of the plan. If we were to make a series of historical illustrations of this kind, and introduce various discordances of dress and circumstance, we should associate in a child's mind a number of things that are not true, with a general fact supposed to be historically true: and the amount of error thus implanted in the mind might be much greater than the worth of the historical fact or facts intended to be fixed

there. Most persons who have attended to the history of their own minds will probably be able to refer some of their opinions and prejudices of mature age to no better authority or evidence than that of a picture.

The objection here laid down is one that might be extended by some people to all fiction—to all works of fiction, to all fictitious representations, whether on the stage or in pictures. But our remarks here have reference to children only, nor do we mean to say that even they should be excluded from all pleasures which belong to the class of fiction and imitation. We should all lose much real pleasure if these arts were banished from life, to the dulness and monotony of which they often give a pleasant stimulus and a cheerful variety. As to children, it may be remarked, as it often has been, that they are not so dull as to take all fictions for realities; and that a child, when he reads fables in which animals and even inanimate things act like rational beings, never for a moment supposes that these things are true, while the value of the moral lesson thus conveyed is not diminished by the wrapping in which it is enveloped. We admit, almost in its full extent, the assertion that children are not deceived by fables; but, on the other hand, we think that, as to any moral benefit, if that is the object aimed at in giving lessons in this form, they are just as efficient as a puppet-show, and no more. If they amuse children and do them no harm, that is enough. But the mischief which arises from allowing children to feed their restless curiosity chiefly on fictitious scenes, whether represented in pictures, or exhibited in the shape of novels, or poetry, is perhaps the cause of a large portion of that feebleness of character which is so apparent in our actual society.

There is much difficulty in stating accurately the

question as to the *fictitious* part of pictorial representation, we mean when it is designed to teach children something by it: if it is merely intended to amuse, we have no objection to all the absurdities and humours which we see in some of the common caricatures. The more absurd and laughable such things are, the better. But when pictures are systematically presented to children with the professed view of inculcating facts, (which it must be remembered will often incidentally inculcate opinions also,) we cannot be too careful to let our facts be true in all cases where particular truth can be attained; and in all other cases, we should give to our pictures at least that general truth and that reasonable probability which will bear the test of future examination, when the child is grown up into a man, with the recollections in his head which it is the professed design of the scheme to make permanent.*

* It is designed by this Society to publish a series of prints illustrative of English History. Most of them will be historical scenes, represented, we believe, as far as is practicable, with regard to the conditions which have been here laid down, as necessary to the usefulness of the scheme. Some of the prints will contain views of edifices and places of historical celebrity, together with correct views of armour, dress, and other things that illustrate the subject.

ON TEACHING ARITHMETIC.

By A. DE MORGAN.

(From the Quarterly Journal of Education, No. IX.)

We may say of instructors, that each individual ought to have either his own system or no system at all. And this refers not only to those who live by tuition, but to all parents and guardians; and is said, not in ridicule of the various plans which appear every day, but from a conviction that the manner and degree in which the intellects of children develope themselves are so various, that few general rules are applicable: whence he must cease to be the slave of a system, and become its master, who would undertake the management of an infant mind. Very few can place themselves in such a position, as must be evident to any one who has had to instruct a class of boys who have left the nursery and the preparatory school to enter upon subjects which need a little previously-acquired power of thought. They *then* begin their education, as their parents think, who little guess that the most important part of it is already past, and that they themselves have incurred a greater responsibility than they can ever afterwards lay upon the shoulders of another. If any man who only knew the real meaning of the word *education*, were told that the rising generation of the richer class was mostly *educated* at Oxford and Cambridge, he would very much over-estimate the quantity of bread and milk consumed in those ancient institutions.

We have thought that some reflections on the method of teaching the simplest of all the sciences might be useful to parents, were it only that we might convince them of the difficulty of their undertaking, as well as of ts necessity. Most of the juvenile treatises on this subject rather tell what to do than how to do it; it is only of very late years that such works have appeared as the Lessons on Number, reviewed in the Third Number of this Journal, in which the process is explained, as well as the result of it. We shall, in succeeding articles, make some observations on other branches of mathematics; but for the present we shall confine ourselves to the elementary parts of arithmetic only.

It is a very common notion that this subject is easy; that is, a child is called stupid* who does not receive his first notions of number with facility. This, we are convinced, is a mistake. Were it otherwise, savage nations would acquire a numeration, and a power of using it, at least proportional to their actual wants; which is not the case. Is the mind, by nature, nearer the use of its powers than the body? If not, let parents consider how many efforts are unsuccessfully made before a single articulate sound is produced, and how imperfectly it is done after all; and let them extend the same indulgence, and, if they will, the same admiration, to the rude essays of the thinking faculty, which they are so ready to bestow upon those of the speaking power. Un-

* *Stupid* is the word employed by teachers when *children* do not learn, or, which is the same thing, when teachers do not know how to teach. We have seen often enough in older children, the sluggishness of intellect which may be called stupidity: but we never saw a *stupid* infant. And hence it suggested itself, that possibly something might have intervened; and by some concatenation of ideas, the Eton Grammar suggested itself.

fortunately the two cases are not equally interesting. The first attempts of the infant in arms to pronounce "papa" and "mamma," though as much like one language as another, are received with exultation as the promise of a future Demosthenes; but the subsequent discoveries of the little arithmetician, such as that six and four make thirteen, eight, seven, anything but ten, far from giving visions of the Lucasian or Savilian chairs, are considered tiresome, and are frequently rewarded by charges of stupidity or inattention. In the first case, the child is teaching himself by imitation, and always succeeds; in the second, it is the parent who instructs, and who does not always either succeed or deserve to succeed. Irritated or wearied by this failure, little manifestations of temper often take the place of the gentle tone with which the lesson commenced, by which the child, whose perception of such a change is very acute, is thoroughly cowed and discouraged, and left to believe that the fault was his own, when it really was that of his instructor.

It is not at all unusual to begin by making the infant repeat the words one, two, three, &c., in succession, and this is called teaching him to *count*. Of course this has no more to do with the matter than it would have if one, two, three, &c., were abandoned, and chair, sofa, table, &c., substituted in their place. To some others a little modification of the above process appears preferable; they point their fingers to one object after another, pronouncing in succession the same words. Thus the child attaches to one, two, three, &c., the notion which properly belongs to *first*, *second*, *third*, &c. We have seen an instance in which a child, on being asked the meaning of three, showed that finger which had usually been

the third in his reckoning. In most cases the abstract numbers only are used, and for the most part in connexion with one particular species of object; thus the learner, hearing the numerals, only or mostly in connexion with counters or his fingers, is led to imagine that what he is doing has some connexion with these things which it has not with others. The numbering is also carried too high, even up to thousands or millions, which is injudicious, as it gives the child names only, and not ideas. We should propose the following method:—Let a number of objects of several sorts be procured, say counters, marbles, and beans, and let the numerals never be used except in connexion with one of these; thus the child should never be allowed to say the word "five," except as a part of one of the phrases, "five marbles," "five counters," or "five beans." Let the different collections of each of these be ranged in rows, from one up to five, and let the child proceed through each set separately, beginning with the lowest, and being made to pronounce "one," "two," and "three," in connexion with the name of the objects. So far he may be supposed to know the names of the different collections in the same way as he knows the meaning of the word "table." In this little range let him be restricted, until he can count or reckon everything which can be counted or reckoned by such numbers. And in counting the collection of "three counters," let him use the words "first counter," "second counter," and "third counter" instead of "one," "two," and "three," beginning the reckoning first with one, then with another of the set. Let every possible question in addition or subtraction be proposed, in which no number or result above three is introduced, and let them be palpably solved by means of all the different objects.

When the learner is perfectly familiar with so much, let the same question be proposed upon objects out of sight, such as horses or trees, until no mistake is ever made. Then, and not before, let the abstract numbers "one," &c., be used in the questions; and even then, if any hesitation appears, drop them and proceed, not caring at what stage the child begins to be able to substitute them. Let ample time be given to this first and simple part, and let the lesson stop when any symptom of weariness or inattention is shown. The collections of four and five may be then cautiously introduced, and so on up to ten, but no farther; care being taken never to introduce a new number until the learner is able to make any addition or subtraction within the compass of the previous ones. Questions should also be given in the reverse processes of addition and subtraction; thus, when the learner has ascertained that four and three make seven, he should be made to find out what other two numbers will make seven, what three numbers will make seven, and so on. Again, having found that four taken from seven leaves three, he should consider what other subtractions give three as the remainder. Thus the first great step would be, to count any number not exceeding ten, and to solve any question of addition or subtraction, in which neither the given numbers nor the result exceed ten. To every question of addition the corresponding question of subtraction should be afterwards appended, in order to illustrate the connexion of the two rules; thus, immediately after the question "how many do four and five make?" should be given, "if five be taken from nine, how many are left?" And this should be first perfectly accomplished, whether it be the work of weeks or months.

This being done, the child should be provided with a measure, such as a strip of deal of a foot in length, which he may be told takes its name from being something near the length of a man's foot. With this he may be shown how to measure the various lengths which fall in his way, provided they be under ten feet. The parts of a foot may be neglected, merely noticing them as they occur, in such terms as "five feet and a little more," "nearly six feet," &c., as the case may be. After some practice the inches and half inches may be marked on the ruler, but nothing lower. The child should then be encouraged to guess at various lengths before measuring them. This exercise, which, judiciously managed, would be an amusement, is admirably calculated to give just notions of the relations of space (a thing sadly neglected in modern education), at the same time that it exercises the habit of counting. We would even add to this a pair of scales and some small weights, with which a similar process should be taught. It is notorious to all who have been in the habit of observing children, that the elaborate and splendid toys, which are often put into their hands, cease to interest after an hour or two of use, while the amusement derived from those which require the exercise of any sort of skill is almost inexhaustible. The toys above-mentioned are of this character, and many more might be added. We proceed to numbers higher than ten.

If our system of numeration gave every number its separate name, independently of others, the method already described should be carried on to the furthest extent of which the memory is capable. But as our common language is closely connected with, and expressive of, our well-known system of notation, it is desirable

that the manner in which the names of numbers are taught should have some reference to that method. And the more strictly this is attended to the better, so that the child should never be permitted to use any number higher than ten, unless it be palpably separated into its tens and units. For this we might propose that a larger ball or counter should be used in the place of ten of the smaller ones, so that before the learner knows the words eleven or twelve, he should have been in the habit of seeing the ten smaller balls removed and the larger one substituted in their place, in all the previous questions of addition the result of which is exactly ten. But it would perhaps be preferable to range the ten balls or counters in a small open box, so made as just to hold them all when placed in a row. The number eleven may then be introduced by placing one ball by the side of this box, and so on. The former method of counting, and the questions of addition and subtraction, should be repeated. When the second ten is finished, the balls should be placed in a similar box, and so on. After twenty, the numbers given to be added or subtracted should increase gradually at first. And here we may give an instance, the principle of which may be made of use throughout the whole course.

It is very desirable that mental arithmetic, that is, the solution of questions without pen or paper, should be carried to a much greater extent than is the case at present. In fact, we may say, that, in nine instances out of ten, no attention whatever is paid to it. It happens in many questions, that the process, which is most convenient upon paper, or rather most in accordance with the methods for the solution of complicated cases, is not

by any means the one which should be adopted in a simple question, such as can be worked by the head. The consequence is, that people in the poorer ranks of life, each of whom, in his own way, has occasion for a limited number of arithmetical processes, acquire, as far as their own wants are concerned, a facility in computation which philosophers might envy. We have heard from good authority an anecdote which sets this in a striking point of view. A society of mathematicians was accustomed to meet at dinner previously to commencing the learned discussions of the evening. One day the bill was brought in and handed to the man of science in the chair, that he might declare how much was due from each. Not having pen and ink, he was puzzled, and gave it over to the distinguished mathematician on his right hand, who found himself compelled to pass it to the next, and so on, till it was returned to the president. In this dilemma the matter was referred to the waiter, who, after looking at the bill for a second or two, named the exact sum which was to be paid by each. Now it is probable that the knowledge of each of these *savans* was to that of the waiter what a park of artillery is when compared with the arrow of a savage; but their acquirements, like the former, could not readily and instantaneously be brought to bear upon a trivial object. We should recommend, that up to a later point than that to which we have come, the arithmetic of the child should be all, in a great measure, mental, and also that attention should be paid to instructing him in the most simple method which the case will allow of. Thus, for example, it is expedient that he should be able to add together in his head any

two numbers, each of which is under one hundred. But the shortest method of doing this is, not by adding the units, carrying, if necessary, to the tens, and then adding the tens; but by adding the tens of one number to the whole of the other, and afterwards adding the units. Thus thirty-five would be added to forty-seven, not in the common way, but by first adding thirty to forty-seven, which gives seventy-seven, and adding five to this, thus making eighty-two. This question should therefore be subdivided into two, of each of which copious examples* should be given; the first, to add a number of tens to another number, such as twenty to fifty-six, eighty to seventy-seven; the second, to add a number of units to a given number, such as seven to twenty-nine, four to eighty-three. When each of these is readily done, the combination of the two, as above, may be given. Similar remarks apply to simple subtractions; all the tens should be subtracted first, and then the units. We must again press upon the attention of our readers the remark with which we began, that the degrees of power are so various, that nothing but observation of each particular case can make the teacher aware what quantity of time or labour each step will require on his part, before it is thoroughly understood by the pupil.

In all that has preceded, we have supposed that the child does not know how to read or write, and, consequently, has no notion of the symbols by which we

* The parent will be much assisted in his task, if he has by him the excellent 'Lessons on Number as given in a Pestalozzian School, Cheam, Surry. London. J. Taylor, 1831.' This work should be in the hands of every one who teaches the first rudiments of arithmetic.

represent numbers. So far it would be useless to carry him above one hundred, below which there is ample range for the development of all his faculties. He might now proceed to such questions of multiplication as fall within this limit; and here we must observe, that the usual sing-song method of making him repeat, twice two are four, three times two are six, &c., is not by any means so useful as the story of Goody Two-Shoes; first, because it does not interest him so much; secondly, because he does not learn so much from it. It must be recollected that he has no idea of the use of the word "times," as employed to indicate repetition of the same number; that he cannot be capable of doing more than adding two or three small numbers together; and that if he is to learn that which he does not know by means of that which he does know, (which should never be lost sight of,) a multiplication must be to him, what it really ought to be to all, the result of several additions, in each of which the same number is added. These additions he should make for himself, with his counters, or whatever may be employed, and the subject should be introduced to him by some practical and palpable question, which may allow his mind to rest upon familiar ideas. Many a child, who votes "three times four are twelve" a nuisance, would be amused by finding out how many apples papa must have, that he may give John, William, and Henry four a-piece. Variety in the questions would increase the attraction; but, unfortunately, power of illustration is so rare, and mere routine has got such a hold on many instructors, that we would recommend any one who writes for young people on this subject, or rather for their teachers, to

supply them with at least a hundred various readings of the above question. Without it, we fear there are some who would never make so great an original step for themselves as to find out that no material alteration would be made in the preceding question if pears were given instead of apples, though perhaps, if they had gone through the discipline of the previous part of this article with their children, they might be led to suspect it.

The process of division, in simple cases, might follow that of multiplication by means of such questions as the following: "If I have twenty apples, how many can I give a-piece to A, B, C, and D?" (substituting, of course, names of persons for the letters.) This question the child should do with his counters; and should then have the question reversed, as in the case of addition and subtraction. Thus the preceding should be followed by "If I give A, B, C, and D, four counters a-piece, how many shall I give in all?" Care should be taken also, in giving instances of this kind which have remainders, to make them perfectly intelligible, as follows: the child has been required to divide twenty-five counters among four persons; after giving them six a-piece he finds he has one left. He must then be asked, how many more are wanted that he may be able to give the same number to all, or how many must be taken away at the beginning, in order that the same thing may be done. But he should not, at this stage, have any idea of fractions given to him.

The next step, and one of the most important in the whole course, is the communication of our decimal system of notation. This, to a child who can neither read nor write, will appear difficult to be done, but may,

by a very simple mechanical contrivance, be rendered as obvious as any preceding part. A piece of pasteboard or wood, with lines ruled from the top to the bottom, and thus divided into six columns at most, with a number of counters not less than a hundred, would serve the purpose very well. But a toy similar to the abacus, which is sold in the shops for the purpose of teaching the multiplication-table, would be preferable, if it were longer in proportion to its breadth, and had more balls on each wire. The one which we should recommend would be such as is represented in the accompanying diagram.

A wooden frame* is traversed by six wires, on each of which are a number of sliding balls. The length should be at least three times the breadth, and the balls, when placed close together, should not occupy a third of the length. There should be at least thirty on each wire. The reader will easily guess that we mean each ball on the first right-hand wire to stand for one, each on the second for ten, on the third for one hundred, and so on. The question now is to convey the same idea to the child. Perhaps it would be advantageous to increase the size of the balls a little in going to the left; at least those on the various wires should be differently coloured: thus the units might be white, the tens red, &c. The instrument being laid on the table, with all

* These instruments are made, according to the directions here given, by Messrs. Watkins and Hill, Charing Cross.

the balls at the further end of the wires, the instructor should bring down one unit to the nearer end of the right-hand wire, then another, and so on, causing the pupil to name each number as it is formed. When ten have thus been brought down, they should be removed back again, and one of the tens brought down, and afterwards one more unit. The pupil should then be asked what number is there, and if he answers *two*, as is very likely, from his seeing two balls side by side, the ten should be removed back again, and the former ten units brought down again on the right-hand wire. He is then instructed to count the number, and finds eleven. The ten units are then removed again, and the single ten on the second wire substituted in their place. If there is still any hesitation as to the meaning, let the process be entirely re-commenced, and this until the pupil has had occasion to observe repeatedly, that a ball on the second wire is never touched, until there are ten on the first wire. It will be better to avoid verbal explanations at first; the object is to enable the child to lay down on the wires any number with which he is acquainted, and he will do this sooner by actual practice than by any general conception which can be given of the local value of the balls. The step from 10 to 11 once made, no further difficulty will arise before 21 at least; if this happen, the process should be again repeated. No further step should be made until the pupil can readily express any number under 100. Numbers also should be given to him not expressed in their simplest form, but having more than ten on the unit's line; for example, three tens and twenty-two units, which he should be shown how to reduce by taking away collections of ten from the units' wire, and

marking them on the tens. The same number should be varied in different ways, on this principle; and to make it more practicable, we should have recommended a longer instrument, with more balls on each wire, had we not thought it might have been objected to as cumbrous and expensive. The pupil should then be directed to form two different numbers on different parts of the abacus, whose sum is under 100; these he should then add together in his head, as he has already been used to do. The balls of the two numbers should then be placed close together, so as to form one; and the reduction of the units into tens should be made. The first examples, however, should be those in which no such process is necessary, such as the addition of 23 to 55. Examples of subtraction should follow, in which the same rule is observed: for instance, 31 from 59. The number to be taken away should be formed on the lower part of the instrument, and the number which is to be decreased, on the higher. The pupil will immediately be able to bring down from the higher number a similar number of balls to those which compose the lower. At last, an instance should be given in which the borrowing of a ten becomes necessary: for example, the subtraction of 26 from 81. These numbers having been formed, the pupil is directed to take the less from the greater, as he has done before. This he immediately finds to be impossible, on which the teacher removes one of the tens from the higher number, and brings down ten units in its place. The pupil, as has been observed, must be made familiar with this process before he begins this operation. Before proceeding any further, a great number of examples should be given, on practical questions, which can be readily

solved on the abacus; and in no case should the child be allowed to proceed to 100, or beyond, until he is perfectly master of the two left-hand wires.

We have no occasion to enter minutely into the method of proceeding with the other wires; we will, therefore, only observe that they should be added to the instrument, so to speak, one at a time, and whenever a new wire is introduced, all the exercises above-mentioned should be carefully repeated. One thing at a time is amply sufficient for the beginner, even when he has already been used to similar things, and it is possible that any inattention or slurring of the process, even at the sixth wire, might introduce confusion among the ideas he has acquired at the previous ones. He may now add three numbers together, for which there are balls sufficient, and may perform combinations of an addition and a subtraction, or of two subtractions.

Multiplication may be performed by repeated additions, which is the only way of introducing it that can be satisfactory. Thus if 117 is to be taken five times, it must be brought down twice, and after the reduction of the tens, again a third time, and so on. If the learner has been previously sufficiently exercised to recollect the multiplication-table as far as ten times ten, he may go through a process more nearly corresponding to that in the books of arithmetic. Previously to this, he must be instructed how to multiply by 10, 100, &c., as follows: the teacher places a simple number on the abacus such as 17, and the same number, in appearance, on the second and third wires, which will stand thus:—

3rd.	2n	1st.
	1	7
1	7	

The pupil, having named these two numbers, has it pointed out to him that each part of the second is ten times the corresponding part of the first, which may be illustrated by actually forming ten sevens and ten tens in succession. When this has been well understood and practised, 17 may be multiplied by 16, by taking it ten times and six times.

Division can only be conveniently done by continual subtraction of the divisor from the dividend; after which the process may be shortened by subtracting it ten times, or one hundred times at once, if possible. So comparatively complex a process may be deferred to the future and more complete course.

If the child show a capacity a little above the common, it may be useful to try him with other systems of notation. For example, a ball on the second wire may stand for five on the first; one on the third for five on the second, and so on. Of these, the *binary* scale, being the most simple, should be most particularly attended to, as illustrating the principle of local value in a remarkable degree, by the number and rapidity of the changes. This, however, should be done with very great caution, as it may confuse the pupil's notions of the decimal or common system, and should never be attempted until he is very well grounded in the latter. At the same time, the abacus may be made useful in the explanation of the common system of weights, measures, and money; for example, the first line on the left hand may represent farthings, the second pence, and so on. It will be found that, by this method, the relations of our weights and measures will be much more quickly learnt than by the common usage of committing tables to memory. Practice will suggest many

other useful applications of this simple contrivance to the attentive teacher, who, unless his experience be very great indeed, will learn more from his pupil than the latter from him.

It remains to connect the methods of the abacus with our symbols of numbers. There is no great reason that this should be deferred until the child can read and write, though it may be supposed that he will be able to do both in the time necessary to pursue the track here pointed out. At any rate, a week's exercise in forming the nine symbols would teach a child of five years old to read and write, as far as arithmetic is concerned. When the forms of these have been well impressed on the memory, as well as their meaning, a paper should be ruled so as to represent the abacus, that is, divided into six columns. Various numbers should then be successively formed upon this instrument, which the child should set down on the ruled paper, putting in each column the number of balls brought down on the corresponding wire of the abacus. The cipher should not be used, or even made known to the pupil at present; the columns which have no balls on the corresponding wires should be left vacant. A simple question of addition should then be taken, and solved in the usual way on the abacus; the pupil at the same time transferring every number and every operation from the instrument to the paper. Some will do this immediately, and it will hardly even be necessary to spend time in explaining the connexion between the wooden and paper instrument. Others will not seize it so quickly; and to some it will be a step of serious magnitude and difficulty. With the latter, the best way will be to pursue the method already employed in ex-

plaining the decimal system, and not to load the subject with verbal explanations; but to continue working examples by both methods simultaneously, until the child sees the thing by himself. If we were writing for those who have had much experience in teaching, we might lean towards the opinion, that explanation should be copiously given; but as our remarks are intended for parents, who, generally speaking, have no very clear notions of elementary arithmetic themselves, still less any acquired facility of illustration, we urge upon them to be very cautious how they venture upon lengthened oral instruction, while the abacus is before them, from which the child may learn more than perhaps they themselves know. And let not even the man of business imagine, that because he can work commercial questions like a clerk, he is therefore qualified to form the basis of this subject in his children's minds, for he may chance to be very much mistaken. The abacus and the paper should be used together until *a little after* the time, when, in the judgment of the instructor, the former might be dispensed with; the latter (still ruled) should then become the sole instrument of computation. In time, the ruled lines should be dispensed with, but still every digit should be kept in its proper place by the eye. When one or two mistakes have been made, from misplacing the numbers, or when, by any other means, the learner perceives the inconvenience of dispensing with the lines, and the necessity of some substitute, the cipher may be introduced, not as a representative of *nothing*, but as a mark set between two digits, which have a vacant column between them, to prevent their being considered as occupying contiguous columns. This may be illustrated

by the blank types which are placed between words in printing. The pupil should then be exercised in writing down numbers which illustrate the use of the cipher, such as 70, 100, 307, 2005, &c. He should be made to observe that ciphers may be prefixed to a number, without altering its value, since they only indicate that preceding columns are left vacant; but that every cipher placed after the number is equivalent to a multiplication by 10. He should also be accustomed to take out any digits of a number, keeping them in their proper columns by ciphers, and naming them until he can assign to any two or more digits of a number their independent value. Thus, in the number 123456, the first three figures are 123,000; the 1, 3, 5, and 6 are 103056, and so on. The pupil is thus, as far as whole numbers are concerned, in a state to begin any rational work on arithmetic.

It is not our intention to detail particularly the method of teaching every rule. The greatest difficulty which boys find in reasoning upon the principles of arithmetic arises from the want of some such previous discipline as we have described. Perhaps the foregoing remarks may enable any instructor to bring the pupil through this first and most important stage; but, in what follows, nothing that we could say would supply the want of an accurate acquaintance with the reasonings on which the various rules are built. The preceding part may, therefore, be considered as addressed to parents in general; but what follows is more particularly for schoolmasters, and others, who instruct older children in classes.

We take it for granted, that children should know the reason of everything they are taught, for which a reason

can be brought within the limits of their capacities. But these are very different in different individuals; and this must be attended to in teaching a number of them together. The rule we should propose is, make them arithmeticians, rational ones if you can; but, at any rate, make them master the processes of computation. There is no reasoning in arithmetic which does not become extremely simple, if the numbers on which it is employed be simple. So much is this the case, that we know they can be comprehended, even by children whose previous education in counting has been very far below the one proposed by us. We should recommend the following detail: the pupils having been formed into classes, and provided with books of arithmetical reasoning, and not merely, as is almost always the case, consisting of nothing but dogmatical rules, the master should explain to them the principle of a rule, as nearly as may be in the words of the book, questioning the pupils as he goes on, to see that they understand every step. When a difficulty arises, the principle on which it depends should, if possible, be separated from the rest, and announced in a distinct form. Copious examples should then be given of it, and on no account should the class be allowed to proceed until it has become familiar to every one. When the demonstration has been thus finished, it should be repeated by one or more of the pupils, with different numbers, first in the words of the book, and then in their own. This is done to help the memory, and the instructor may be nearly sure that no one of his pupils will be able to substitute other *data* in a process of reasoning, unless he understand it. The rule is then to be reduced to its simplest form, which will usually require one or two additional

observations. We are not against learning these rules by heart, provided they be reduced to the utmost degree of conciseness. One or two simple examples should then be worked, first by the master, and then by the pupils; after which the latter should be dismissed to practise what they have learned. The same examples should not now be given to all; those who have shown the greatest facility of comprehension should have the more difficult ones. As soon as a rule has been thus finished, other questions should be given which combine the previous ones with it. Thus, in multiplication, questions should be given in which certain additions and subtractions are necessary to form the multiplicand and multiplier. The commercial rules should go together with the corresponding rules for abstract numbers, as the second differ in no respect from the first in their principles.

We consider arithmetic as a preparation for algebra, and the higher parts of mathematics. With each rule, therefore, we should introduce the algebraical signs and terms which are connected with it, so that, on beginning algebra, the pupil may be familiar with the signs $+ \; - \; \times \; \div \; =$, &c., and the words second power, third power, &c. The words *square* and *cube* are perhaps objectionable, in their arithmetical sense, though we do not see what harm could arise from using them, if it were distinctly explained that they are incorrect terms, sanctioned by common usage. We are advocates for the use of many words which have gradually glided out of our books; such, for example, as minuend, subtrahend, resolvend, &c. We would even propose to coin *addend*. It must not be imagined that these terms are hard, because they are Latin and polysyllable; the

ideas attached to them are very distinct. Certainly, if simple Saxon equivalent terms could be found, it would be an advantage, with regard to these and many others, particularly *numerator* and *denominator*. We would even carry our extensions of arithmetic as far as the gates of algebra; not giving any reasoning with algebraical symbols, but accustoming the pupil to translate literal expressions into their corresponding arithmetical results in particular cases. Thus, instead of telling the learner to add together 18, 19, and 20, we would ask him, after previous explanation, what $a+b+c$ stands for, where a stands for 18, b for 19, and c for 20? This would give the instructor an unlimited command of examples, while it would prepare the pupil to reason upon general symbols, by accustoming him to their sight. We would not, however, introduce him to the use of exponents, but would write aa for a^2, aaa for a^3, and so on. But here, as everywhere else, the progress should be very gradual from simple to more difficult expressions. It would also tend to interest the student, if problems, of which the algebraical solution is given, were presented to him for the application of arithmetic in particular cases. For example: 'It is found that if one man can finish a job in a days, which another can do in b days, they will do it both together in $\frac{ab}{a+b}$ days. What number of days will both do it in, which the first would finish in 72, and the second in 36 days?' Such instances as these would give views of the nature of general expressions, and the use of reasoning upon them. It would also teach the pupil to look forward to a higher science, and would relieve what the taste and constitution of most lead them

to call the *drudgery* of computation, in the application of which term we heartily join them.

Our limits will not allow of any further observations on this branch of the subject. We propose, however, in the next number to follow up our remarks by some others upon the teaching of fractions, and the higher parts of arithmetic, and, if we have room, the principles of algebra. We shall not quit the subject until we have gone through the elementary branches of mathematics. Whatever we may think of the higher parts, we are sure that these may be made accessible to any capacity, if the discipline be begun at an early age. We would caution those who teach, against measuring the progress of a student by the number of results he has learned, even if he is really ready in their application. If any of the processes we have described should seem a waste of time, let them recollect that, as the case actually stands, many years are passed (as far as this subject is concerned) in learning a few rules very badly. We think that much more might be well learned in the same time than is now learned at all; but if not, and if experience should at last oblige us to decide, that six or seven years are necessary to acquire only the facility of computation necessary for common purposes, it would be a great change for the better if a system could be introduced by which the pupil should think as well as work.

Since this article was printed we have learnt that flattened glass beads are made at Birmingham, at a very cheap rate, which might be strung in tens or hundreds, and supply the place of the boxes in page 5.

ON THE METHOD OF TEACHING FRACTIONAL ARITHMETIC.

By A. DE MORGAN.

(From the Quarterly Journal of Education, No. X.)

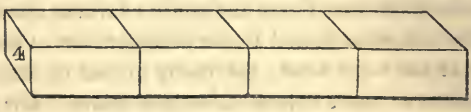
In the preceding article we developed a method of giving the first notions of whole numbers to children. We now proceed to treat the fractional part of arithmetic in the same manner; premising, however, that on no account should this ground be entered until the pupil has the clearest notions, not only of the method of numeration, but of the first four rules in whole numbers. We do not mean that he should be ready at the solution of questions which involve high numbers, that is, at the mechanical part of the subject; but he should at least be competent to perform any addition or subtraction of not more than four figures, any multiplication of two figures by two figures, and division of three figures by two others.

In treating of whole numbers, where it was sufficient that each *one* should be like the others, we used marbles or counters: these should now be entirely rejected; the child will be confused by any attempt to divide them into parts, as the whole and its parts will not then be entirely of the same character. So long as nothing more was necessary than to compare one counter with another, all was well, because each unit entirely resembled every other unit; but if we were now to cut these *ones* into fifths, the fifths would not be of equal dimensions, nor could the child make a *one* out of *any* five fifths. Neither will it be sufficient to take any number of balls,

say six, and calling the whole six *one*, to call each ball *one-sixth*, since this method, though advisable at a later stage, would only introduce confusion at present. It is, therefore, desirable that the unit should now be perfectly simple, and capable of division into parts exactly like itself; for which purpose we shall adopt *length* as the object of measurement. We must also observe that the preliminary notions are *now* to be almost entirely created, while they did exist, though in a rude form, when the pupil first began the study of whole numbers. He has been accustomed to the consideration of several things of the same kind, but rarely to that of the division of one of these objects into *equal* parts. His *half* has, most probably, been merely a division into any two parts whatsoever, and he can accordingly, with perfect consistency, talk of the larger and the smaller half. There is, therefore, more preliminary work, and, as in the case of whole numbers, palpable means of instruction should be adopted. We should recommend the following simple apparatus, making no apology for putting the parent to further expense and trouble: if there be any one of this class who does not think the education of his children the very first object of his life, next to procuring subsistence for them, and arithmetic a most important part of that education, we advise him to laugh at us, and put this paper aside,—we are not writing for him.

Let from twelve to twenty slips of cheap wood be procured, each exactly one foot in length, and about two-tenths of an inch in breadth and thickness. Let the first of these be divided by a line, or a scratch extending all around it, into two equal parts; the second into three equal parts; the third into four equal parts; and so on up to the eleventh, which will be divided into

twelve equal parts. These will be enough at first, but we should further recommend several other slips, divided respectively into 36, 60, 84, 90, 100, 120, and 180 equal parts; which numbers are chosen on account of their having a great number of divisors, considering their magnitude. On the small ends of each rod let the number of parts be marked into which the foot is divided. The following is a representation of the rod in which the foot is divided into quarters :—



A common pair of compasses will also be necessary. It might be thought that one rod would serve the purpose of four, if the sides were differently divided, but this is not the case, as will be seen hereafter; and also that the halves and quarters might be placed on the same rod, and so on; which, however, would be directly against our object, as tending to something like taking for granted one of the simple propositions, of which we wish to furnish a palpable proof.

These rods having been laid side by side, the pupil is called upon to observe that they are all of the same length, being that which he has used and called a foot, if the suggestion of our last article (page 55) has been adopted; if not, that method should be now put in practice previously to going any farther. He should then have his attention drawn to the fact that each foot rod is divided into *equal* parts, that is, that the subdivisions of each rod are equal, but that those on different rods are unequal. This he should ascertain by measurement with the compasses. Again, he is to

observe that *two* equal parts make the whole foot on the first rod, *three* on the second, and so on; and that the number of divisions on each rod is marked on its extremity. Let him call this number the *denominator* of the rod; the meaning of the verb to *denominate* having been previously explained by familiar instances. Let it now be told him that when three equal lines make up a foot, each is called one *third* of a foot, and so on; illustrating this phraseology by questions of the following form:—'Twelve pence make one shilling; what part of a shilling is one penny?' until he is ready with the answers. At last, let the half feet be shown him, and the name of one of the parts required; if he answer one *second* of a foot, inform him that he is right, but that the words 'one half' are usually substituted for 'one second;' if he answers 'one half' of a foot, ask him what it should be, if it were named like the rest; and thus lead him to the phrase 'one second.' Follow the same process with the words 'one quarter' and 'one fourth.'

If any person should think this detail rather minute, we are glad of this opportunity to inform him that it is not every pupil, educated in the ordinary manner, who knows what are the denominators of the fractions one half and one quarter without some reflection, and occasionally a mistake.

The next step should be to establish in the mind of the pupil the order of magnitude in the simple series *one half, one third*, &c. He is not by any means so familiar with the fact that one fourth is less than one third, as he is with its reciprocal, that four are greater than three; and, to accustom him to feel the first as strongly as the second, he must repeat it often, accom-

panied by reference to the simple reasoning which connects the two. He should then be exercised on the different fractions, by such questions as the following :—What is meant by one fourth of a foot?—What is the denominator of this fraction?—Name other fractions which are greater and less.—How many times is one fourth of a foot contained in one, two, three, &c., feet? or, What is two feet in fourths of a foot, &c.? The abstract fraction, *one fourth*, should never be mentioned : it should, at first, always be one fourth of something tangible, and actually present; next of some sensible object not present; and lastly one fourth by itself, only when the pupil is able, without hesitation, to answer all the previous questions. Neither should the abbreviation $\frac{1}{4}$ be yet introduced. We may lay it down as a general rule that no new symbol should ever make its appearance until the words which it expresses are so well understood that the learner can exemplify them at length without an instant's hesitation.

The next step is to habituate the pupil to the more complex fractions—three fourths, two sevenths, &c. This may be done by taking one of the rods, that which shows fifths, for example, holding it so as to let only two appear, and asking the learner to count them. To the question 'How many are here?' should succeed 'Two of what?' the answer being *two* fifths of a foot; and afterwards 'How many fifths are left?' This process having been continued until the learner can show any fraction whatever whose denominator is within the compass of the rods, he should proceed to simple questions of addition and subtraction where the denominators are the same; such as—How many do two sevenths and three sevenths make?—What remains

when three eighths are taken from five eighths? &c.; care being taken that the sum of the fractions shall not be greater than one foot: these should be done at first upon the rods, and afterwards in the head.

The term *numerator* may now be introduced, by requiring the learner to name some fraction, five sevenths, for instance, and having made him tell the denominator, by pointing out to him that the five is called the numerator, and explaining the term as that which *numbers* or counts how many parts there are in the fraction, while the denominator tells how much of a foot each of the parts is. The pupil should then be required to show different fractions having the same numerators but different denominators, and others having the same denominators but different numerators. Of these pairs he should be made to point out the greater and the less, until he has a clear perception of the following results:—Of two fractions having the same denominator the greater is that which has the greater numerator; and of two fractions having the same numerator the *less* is that which has the *greater* denominator. Of course we are not proposing that he should commit these sentences to memory; and, generally, we would observe that we are addressing ourselves to the teacher, and not to the learner; the teacher, must, therefore, be on his guard against using our expressions when there is any difficulty in them.

The pupil should now be instructed how to measure several lengths, each of which is less than one foot, with all the rods in succession, marking between which subdivisions each length falls. This is intended to give him an opportuuity of applying by himself what he has learnt, and will save the teacher some trouble. He should be made to tabulate the results, giving the near-

est subdivision. Thus it might happen that one length may be denoted by one half, as its nearest value when the rod 2 is used, but much more nearly by five-ninths when the rod 9 is used, both being approximations only. In this way various fractions on one rod should be measured as nearly as possible on the others; for example, it should be found between what sevenths one half lies, between what fifths four ninths lies, and so on. These should be determined simply by bringing one rod in contact with another. There are also many properties of fractions which may be seen on the rods, and which will furnish similar exercises. For example, one fifth exceeds one sixth by more than one sixth exceeds one seventh; one third exceeds one sixth by more than one sixth exceeds one ninth, and so on. Again, two thirds is greater than one half, three fourths than two thirds, and so on; and the excess of two thirds above one half is greater than that of three fourths above two thirds. The judgment of the instructor will guide him as to the time during which this exercise should be continued, which should be until the learner has a tolerable notion of the different fractions whose denominators do not exceed ten; we mean, of course, so far as such a notion can be gained by the eye alone.

We would now begin to accustom him to the arithmetical way of expressing fractions, upon which no further explanation can be given except the bare fact that the denominator is written under the numerator, with a line between the two. There is so little analogy between this notation and anything which the child has previously learned, that further elucidation would be impossible. Before he proceeds any further, he should translate all he knows out of the old language into the new; for example, such sentences as—two sevenths and

three sevenths make five sevenths,—which he may now write $\frac{2}{7}$ and $\frac{3}{7}$ make $\frac{5}{7}$; or, if the meaning of the simplest algebraical signs has been previously explained, $\frac{2}{7} + \frac{3}{7} = \frac{5}{7}$: but, if this has not been done, do not let the signs be now introduced at the moment when another totally new thing has just been learned. We have now completed the first great step,—namely, those preliminary ideas of the meaning and notation of fractions, which are indispensable to the right understanding of the succeeding operations.

The learner should now be made to understand the difference between *prime* and *composite* numbers. It should be pointed out to him that there are some numbers, such as 12, which contain other numbers an exact number of times; and others, such as 13, which contain no other number except 1 an exact number* of times. He should then be required to make a list of all the prime numbers under one hundred, and of the *factors* of all those which are not prime. But in doing the latter, every factor so obtained should itself be reduced into its factors, if it have any. Thus, for example, 72 is 9 times 8, of which 9 is 3 times 3, and 8 is made by multiplying 2, 2, and 2. The *prime* factors of 72 are therefore, 3, 3, 2, 2, 2. And it should be pointed out that 72 is divisible by either of these, and also by the product of any of them, as also that the multiplication of all together produces 72, in whatever order the operations may be made. The pupil should then, having resolved two numbers into their prime factors, be shown how to find the greatest common measure of the two,

* Or the child may learn this experimentally, by arranging 12 beads in parcels of *twos*, *threes*, &c.; while he will find that 13 beads cannot be arranged in any equal parcels of more than *one*.

by multiplying together all those factors which are found in both. For instance, 72 is found to have the factors 3, 3, 2, 2, 2; and 90 the following ones 3, 3, 2, 5. The product of the common factors, 3, 3, 2, gives 18, the greatest common measure of 72 and 90; while the remaining factors of 72, viz. 2, 2, which give 4, and of 90, or 5, give the quotients of 72 and 90 when divided by 18. The rule given in the books for finding the greatest common measure should not be introduced here, as we have no occasion for high numbers, and the process above described is more simple. A table should then be formed, extending from 1 to 100, of which the following is a specimen:—

Number.	Factors.	Number.	Factors.
50	2, 5, 5	55	5, 11
51	3, 17	56	2, 2, 2, 7
52	2, 2, 13	57	3, 19
53	———	58	2, 29
54	2, 3, 3, 3	59	———

Let the two rods marked 9 and 6 be presented to the pupil, and let him be required, as in former cases, to express each sixth in ninths. He will find that one-sixth lies between one and two-ninths, but that two-sixths is exactly three-ninths, and also that four-sixths is exactly six-ninths. On referring to the rod 3, it will be found that two-sixths is also one-third, and four-sixths two-thirds. Let this and other results of the same sort be written down; for example,

$\frac{2}{6}$, $\frac{3}{9}$, and $\frac{1}{3}$ are the same,

$\frac{6}{12}$, $\frac{5}{10}$, $\frac{4}{8}$, $\frac{3}{6}$, $\frac{2}{4}$, and $\frac{1}{2}$ are the same.

When a sufficient number of these are collected together, let the pupil be called upon to notice that no two fractions of a foot are the same length, unless the

numerator of the first can be changed into the numerator of the second by exactly the same multiplication or division, which changes the denominator of the first into the denominator of the second. Take, for example, $\frac{2}{6}$, and $\frac{3}{9}$. If the learner be asked how to change 2 into 3, he will probably answer, by adding one. If, however, he be asked to change 2 into 3 by multiplication and division only, he will be at a loss. He must then be shown, which will immediately appear to him, that 2, divided by 2 and multiplied by 3, gives 3, and the same operations performed upon 6, namely, division by 2 and multiplication by 3, gives 9. Or it may be thought preferable to show the coincidence of $\frac{2}{6}$ and $\frac{1}{3}$ by the rods, and afterwards of $\frac{1}{3}$ and $\frac{3}{9}$. Both methods may be employed with advantage. The rods should now be read again and again, until the learner can give all the simpler equivalent fractions in the following way, —one-twelfth; two-twelfths, one-sixth; three-twelfths, one-fourth, &c. This having been done, it should be noticed that the scale of twelfths also contains that of sixths, fourths, thirds, and halves, and the pupil should mark off these several scales on the one which contains them all with chalk, one after the other. It should be remarked, at the same time, that 12 is divisible, without remainder, by 6, 4, 3, and 2.

The same process should be repeated with other rods, and the instructor should be satisfied with directing the attention of the pupil to the facts, in such a way as to enable him to apply the same to another case, without any reasoning at present. Our object now is to convey clear notions of the value of fractions to the eye and to the mind, as a preparatory step to the process of reasoning, by which the results obtained will be afterwards

connected. The preceding exercises should be continued until the pupil can with facility find the scale on which two different sets of fractions can be found, and will look, without hesitation, for the scale of twelfths, to find both the thirds and fourths, and so on. In looking through the different cases, he will find that, though generally the two denominators of two different scales may be multiplied together, in order to find the denominator of the scale which contains both, that there are cases of exception; for example, the sixths and fourths are found on the scale of twelfths, as well as on that of twenty-fourths. This will be the time to make him remark that 6 and 4 have a common multiple less than 24, owing to their having the common measure or factor 2. He should then be exercised in finding the least common multiple, by dividing the two numbers into factors from his table above-mentioned, joining with the factors in the first number all those of the second, which are not common to the two, and multiplying the whole together. Thus, in the former instance, of 72 and 90, made respectively from the factors 3, 3, 2, 2, 2 and 3, 3, 2, 5, the factors 3, 3, 2, are common to both, and there remains from the second, 5, which, multiplied by all in the first, gives 360; so that, as he will then know, the scale of 360th parts is the lowest which exhibits the 72nd and 90th parts. After sufficient exercise on this part of the subject, it may be shown that the halves of the halves are found on the fourths' scale, that the thirds of the fourths are found on the twelfths, and so on. Thus, any question of *multiplication* of fractions, as it is called (though this name should not be used at present), may be solved, provided the product of the denominators does not go beyond the

rods. For example, the learner is asked the following question. What is two-thirds of one-fourth of a foot, or what single fraction of a foot is obtained by dividing the foot into four equal parts, and taking two-thirds of one of those parts? He knows that the thirds and fourths are both found in the scale of twelfths, on which scale he finds the fourth divided into three parts, each of which is a twelfth, so that two-thirds of one-fourth is two-twelfths or one sixth. We are not anxious that the rule should be engraved in the pupil's memory at this period; he cannot fail, after a sufficient number of examples, to stumble upon it; and it would not be judicious to stop the course of his investigations, by any such piece of mechanism, one moment before that time.

With regard to the addition and subtraction of simple fractions, let the pupil now be asked which is the greater of two fractions, in which the answer is not very evident to him at first, for example, two-thirds and three-fourths. He knows that he will find both of these on the scale of twelfths, which he should then be made to divide into thirds and fourths, placing chalk marks of different kinds on each of these divisions. The answer to this question will then be evident, as well as the number of twelfths, by which one exceeds the other. Neither will the sum of two fractions offer any difficulty, when it does not exceed the whole foot. The learner should at this time be called upon to notice, if any difficulty be found in adding, that it is indifferent from what part of the scale any number of fractional parts are taken; for example, that the first and fourth quarters, or the second and third, constitute the half, as well as the first and second.

The most difficult process is the division of one

fraction by another; a name which, like that of multiplication, it would not be wise to introduce at this period. Nevertheless such a question as the following might be asked:—"I bought two-thirds of a foot from a man who had three-quarters to sell; how much of what he had to sell did he sell to me?" This would be a puzzling question, since the learner, though perhaps very willing to admit that more than half of the quantity was sold, would not see any means of determining the precise fraction. Let him then mark out the thirds and fourths on the scale of twelfths, rubbing out afterwards all his marks, except that which distinguishes the quantity to be sold and the part of it sold. Showing only three-fourths of the foot, ask into how many parts it is divided on the scale of twelfths, which is 9, and how many of them are sold, which is 8. The learner will then, if he understands the preceding part, see that eight-ninths of the whole three quarters is sold. This exercise should be often repeated, and also such as are exemplified in the following questions, of which we give the method of solution. If three-fourths of a foot cost a shilling, how much will one-third of the foot cost. The learner may imagine the shilling rolled out into silver wire, of such thickness as to be three-fourths of the foot in length. This may be represented palpably by a bit of string. The question then is, how much of the string is one-third of the foot in length. Removing the string to the scale of twelfths, where both thirds and fourths are found, it will appear that the string extends over nine parts, of which one-third of the foot contains four; so that one-third of the foot costs four-ninths of the shilling. Again, if three-fourths of a shilling be given for the whole foot, how much of the shilling

should be given for two-thirds. Here the whole shilling must be so rolled out, that three-quarters of it shall extend along the whole foot; that is, when applied to the scale of twelfths, there will be twelve parts in three-quarters of the shilling, and four parts in one-quarter; consequently, sixteen parts are the length of the whole shilling. Of these parts two-thirds of the foot contain eight, so that eight-sixteenths, or one-half of the shilling, is the answer. It may here be objected that these questions might be more simply answered by converting the fractions into whole numbers; by saying, in the last example, that four feet must cost three shillings; at which rate two feet would cost three half-shillings, and two-thirds of a foot the third part of this, or one half shilling. This is true; but it must be recollected, that the mere solution of such questions is no part of our object. We want to give the beginner a notion of fractions, as such; not to avoid the difficulties by working only with whole numbers; and to accustom him to the determination of the fraction which one quantity is of another, when both are given in terms of a whole. The rules which he will afterwards demonstrate and work by, will be in effect the simpler process just described; but, for the present, he is to reason upon *fractions*, keeping in mind that they are fractions, and accustoming himself to, instead of avoiding, the real difficulties of the subject. This, with the assistance of the tangible illustrations which we have used, will not be found impracticable.

The pupil now returns to the division of whole numbers, which he left incomplete whenever there was a remainder. Let some simple example be taken, such as the division of 7 feet into 3 equal parts. If each foot

be divided into three parts, one of those parts goes to each third of the 7 feet, so that 7 thirds of one foot, or 2 feet and one-third, is the third of 7 feet. The pupil should repeat and demonstrate similar results until he is familiar with them, care being taken that no confusion arises from the phrase *seven-thirds* of a foot, which must be explained simply as a third of a foot repeated seven times, making more than a whole foot, and not a part taken out of a single foot, as in all the fractions hitherto used. He must then repeat questions on the various rules hitherto obtained, with these fractions greater than unity. He will find no difficulty in converting whole numbers into fractions, such as seven into fourteen halves, twenty-one thirds, &c.

The extension of the meaning of words is made too soon in our works on arithmetic. Among them we may mention multiplying by 1, dividing by 1, using the fraction $\frac{3}{1}$ to stand for 3, and, above all, the terms multiplication and division of one fraction by another. If there be a notion which the pupil is sure to catch from the preceding arithmetic of whole numbers, it is that multiplication increases the multiplicand, and division diminishes the dividend. Nevertheless, on coming to fractions, he finds multiplications which decrease the quantity multiplied, and divisions which increase the quantity divided. The connexion between the different cases may be explained thus. Let the two following questions be given:—If one yard cost 7 pence, how much will 8 yards cost?—If one yard cost $\frac{7}{8}$ of a penny how much will $\frac{1}{8}$ of a yard cost? In the first case the answer is clearly 8 times 7 pence, and the term multiplication may be applied. In the second case $\frac{1}{8}$ of $\frac{7}{8}$ of a penny must be taken, giving, by the process already explained,

$\frac{8}{15}$ of a penny, which is less than $\frac{2}{3}$ of a penny. The rule derived from the second has the name multiplication given to it, incorrectly as far as etymology is concerned, because it is the process which must also be applied where the given numbers are fractions, and real multiplication *would* have been performed, *if* they had been whole numbers. This the pupil should be told at length, and a similar explanation should be given of the term division when the fractional rule has been obtained from solving the following questions:—If 8 yards cost 56 pence, what does one yard cost? If $\frac{4}{5}$ of a yard cost $\frac{2}{3}$ of a penuy, what does one yard cost? The learner should also be made to dwell on such expressions as—

$$\frac{2\frac{3}{5}}{\frac{1}{5}} = 69 \qquad \frac{\frac{2}{5}}{\frac{7}{6}} = \frac{12}{35} \qquad \frac{7\frac{3}{5}}{\frac{3}{5}} = 6$$

It being explained to him that if the numerator contains the denominator an exact number of times, the fraction stands for that number; but that if this be not the case, the numerator, though not an exact number of times the denominator, is a fraction of it, as in the second example, where $\frac{2}{5}$ is $\frac{12}{35}$ of $\frac{7}{6}$, that is, can be made from $\frac{7}{6}$ by cutting the latter into 35 equal parts, and taking 16 of them. He should also be required, as an exercise, to form the first 20 whole numbers from any given fraction by multiplication, division, or both, as the case may be, until he can readily give the steps which will turn any number, whole or fractional, into any other. This is, in truth, the main difficulty of the subject; and should be dwelt upon in proportion to its importance. Thus explanations of the following kind should frequently be given. The question asked is;—what is meant by saying that 1 divided by $\frac{3}{4}$ gives $\frac{2}{3}$? And the answer may

be given in either of the following ways; $\frac{3}{2}$ is made into 1 by taking the third part of $\frac{3}{2}$ twice; or 1 does not contain $\frac{3}{2}$ as much as once or a whole time, but only two-thirds of a time. The second of these explanations should be further developed; beginning with the familiar explanations of pounds, shillings, and pence, or feet, inches, and yards, representing the same length both in yards and feet, using fractions of either if necessary, until the pupil catches the idea that the unit is arbitrary, and that every magnitude may be represented by any number or fraction whatsoever, by properly assuming the unit.

When the ordinary rules contained in the books have been studied, the pupil, if he be destined to pursue the mathematics to any extent, should repeat them on fractions which have fractional numerators and denominators, first by reducing these complex fractions by the rule already obtained for division, and next without any such reduction. For example, in the addition of—

$$\frac{\frac{7}{9}}{\frac{4}{5}} \qquad \text{and} \qquad \frac{3}{\frac{5}{9}}$$

which, in their simplest forms, are $\frac{35}{36}$ and $\frac{27}{20}$, giving the sum $1\frac{97}{180}$. But if the usual process be followed, using the addition, multiplication, &c., of fractions instead of whole numbers, the process may be performed thus—

$$\frac{\frac{7}{4} \times \frac{9}{5} + 3 \times \frac{4}{5}}{\frac{4}{5} \times \frac{9}{5}} \text{ is } \frac{\frac{14}{27} + \frac{12}{5}}{\frac{36}{45}} \text{ or } \frac{\frac{378}{135}}{\frac{36}{45}} \text{ or } 25\,\tfrac{177}{180}$$

which is the same as $1\frac{97}{180}$. This method will furnish a method of verification, which will aid the instructor, and save some drudgery.

With regard to decimal fractions, there is no consider-

able difficulty which has not been already considered, with the exception of the notation. The pupil may be made familiar with the scale of tenths and hundredths, by the palpable illustrations already used, and afterwards with those of thousandths, &c. From the very commencement, he should be made familiar with the conversion of hundredths into tenths, by the constant repetition (with explanation) of the table;—ten hundredths is one-tenth, twenty hundredths is two-tenths, &c., and he should also be exercised in the reduction of a number of hundredths to its *nearest* tenth, by being made to find out, for example, that 37 hundredths lies between 3 tenths and 4 tenths, but nearer to the latter. The same method should be pursued with the hundredths, thousandths, &c. He should then separate a number of thousandths, for example, into its tenths, hundredths, and thousands, such as 486 thousandths into 4 tenths, 8 hundredths, and 6 thousandths, until he is as familiar with this process as with the previous part of the decimal notation. Recourse may then be had to the ruled columns used in the last article, in which a dotted line may be made to separate the column of units from that of tenths. Thus 1 in the first column on the right of the dotted line will stand for one-tenth of a unit; in the second column for one hundredth of a unit. After a time the lines may be rejected, any empty columns after the units column may be filled up with ciphers, and the place of the dotted line preserved by a single point placed between the units and the tenths. This method having been fully explained in the last article, there is no occasion to dwell upon it here. We would recommend, however, that the decimal point should always be placed at the head of the figure, and not, as

is very often done, at the bottom. Thus $6\frac{8}{10}$ should be written 6·8, and not 6.8, or 6,8, the second being reserved to signify six times eight. This will save some confusion when the student comes to the subject of Algebra.

As soon as the meaning of the decimal point has been established, the first exercise should be upon the effect of removing it any number of places to the right or left. Thus the student should write such series as ·00681, ·0681, ·681, 6·81, &c., both in the decimal and common notation, and should be required readily to assign the multiplication or division, which will reduce any one of this series to any other. This is not much attended to in ordinary works on the subject. In demonstrating the rules, the student should reduce the decimal notation to the common fractional one, which removes all difficulty, if he understand the methods for ordinary fractions. The only rule which will cause any embarrassment is that for division. This must be preceded by the rule for turning any common fraction into a decimal, approximately. We would recommend that all rules relative to *circulating* decimals, as they are called, should be entirely omitted. They are of no use in practice, and the theory cannot be understood previously to that of geometric series in general. The reduction of common into decimal fractions may be thus simply taught. It is wished to ascertain how many thousandths of the unit is contained in the seventh. The division of $\frac{1}{7}$ by $\frac{1}{1000}$, with which the student is already familiar, gives $1\frac{000}{7}$ or $142\frac{6}{7}$, or one-seventh contains 142 thousandths and six-sevenths of a thousandth part, or 143 thousandths nearly, that is ·143. The rule should not be applied until the student has worked a large num-

ber of examples in this way. The division of one decimal by another amounts to the reduction of a given fraction to a decimal, as may be shown by the common method. Thus ·014 divided by 6·81 amounts to the reduction of $\frac{14}{6810}$ to a decimal fraction. This method should supersede the common one for some time, until the student can nearly guess in what part of the quotient the decimal point will be found.

As our object is rather to point out the way in which the first principles may be taught, than to give a detailed course of instruction, we shall not enter further upon the subject of arithmetic. We must observe that the want of a familiar acquaintance with common and decimal fractions is the source of nine out of ten of the difficulties which are commonly found in the study of algebra. Still more is this defect the reason why so few are perfectly at their ease in the processes of commercial arithmetic. It seems to be a tacit agreement between elementary writers on this last subject and their readers, that no knowledge of decimal fractions shall be assumed to be possessed by the latter. Thus it is that many cumbrous processes* are introduced, involving pounds, shillings, pence, and farthings, which, if the reader had only the most moderate knowledge of decimal fractions, might be greatly simplified. This will never be remedied, until rules are not only learnt, but understood.

We shall proceed, in our next Article, to the elementary study of Geometry.

* See the "Penny Magazine, vol. ii. No. 52." "Simplifications of Arithmetic, No. 1."

ON THE METHOD OF TEACHING THE ELEMENTS OF GEOMETRY.

By A. DE MORGAN.

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The science of geometry holds, in some respects, the middle rank between arithmetic, in its widest sense, and natural philosophy, or physics. It consists in the discovery and establishment of the properties of space, or of matter, considered only as that which occupies space. As a part of education, it has always been selected as the medium in which the young might be trained to strict and formal reasoning; and though this is the ground on which it is most defensible as a study, the actual knowledge gained by it is not therefore of small importance.

In our preceding articles, on the Teaching of Arithmetic, we could reasonably suppose that the subject was capable of being so treated, that any parent might enable himself to instruct his own children. Here this is not the case; it would require a treatise to develop our method, so that a grown person, ignorant of geometry, might undertake the task of teaching by it. We suppose a knowledge of at least six books of Euclid, and shall, therefore, content ourselves with merely indicating many things, as perfectly well known to the reader.

We shall consider our present subject under two heads, the first relating to the manner of teaching the terms and the facts of geometry, the second to the method of deducing them from one another by reasoning.

It has not been usual to make this division. Atten-

tion to what is called the rigorous geometrical method has generated an aversion to communicating the truths of geometry in any other form than that in which they have been delivered by Euclid, so that those who have neither time nor capacity to study the strictest books, have always been left without any accurate knowledge of some of the most essential properties of matter, *viz.*, those involved in its form or shape. This has not been the case with the *mechanical* properties; here we have popular works in abundance, which do not refuse to exhibit the phenomena of a screw, because the reader cannot connect it geometrically with the inclined plane, or to talk of the various laws of mechanics, because that universal recipient, the principle of virtual velocities, is above the capacity of a beginner. We would not, however, be understood to depreciate the reasoning or to deny its utility in the smallest degree; we only say, that one who is never likely to reason upon them is better off with a knowledge of the facts than with nothing at all, and that with children a preparatory course of experimental geometry is the best introduction to the severer study.

An editor of Euclid, in the last century*, who deserved credit for a careful edition of the *whole* of the Elements, in criticising Clairaut for his avowed departure from the strictness of the Grecian model, makes the following remarks, which though not without their force, when directed against experimental geometry as an ultimate course of study, lose their ironical character and become serious earnest, when applied to the same as a preparatory method.

* Elements of Euclid, with Dissertations, &c., by James Williamson, M.A., Fellow of Hertford College, Oxford. Clarendon Press, 1781.

"Elements of geometry carefully weeded of every proposition tending to demonstrate another; all lying so handy that you may pick and choose without ceremony. *This is useful in fortification;* you cannot play at billiards without this. You only look through a *telescope* like a *Hottentot* until this proposition is read, with many such powerful strokes of rhetoric to the same purpose. And upon such terms, and with such inducements, who would not be a *mathematician?* Who would go to work with all that *apparatus* which I have described as necessary for understanding Euclid, when he has only to take a pleasant walk with *Clairaut* upon the flowery banks of some delightful river, and there see, with his own eyes, that he must learn to draw a perpendicular before he can tell how broad it is?" &c.

Let the faults of this style be upon their author; he expresses to the letter what we should wish to do with children, not instead of, but previous to, anything else. If the facts were well selected, leaving out those which are only useful in demonstrating others, and not conspicuous for themselves alone; if their truth were made manifest by measurement, and their utility by application, whether to a billiard-table or a bastion, a telescope or the measurement of an inaccessible distance; we may ask in the terms of our quotation, "with such inducements, who would not be a *mathematician?*" that is, what child of moderate powers would not be interested in the announcement, that his separate truths are parts of one chain, and that it may be shown that one follows from another; and who would not desire to follow this chain and acquire a new faculty? The consequence of such a previous discipline would be, that the student would not have to learn a new language at the moment

when he begins an untried exercise of mind; he would study the several parts of a dissected map before he begins to put them together.

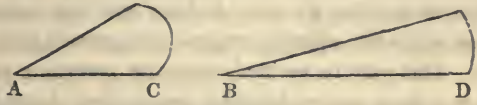
Our preliminary method would depend more upon palpable objects than even in the preceding articles: for, whereas, in arithmetic, the tangible instruments were only helps to the acquirement of a difficult abstract notion,—in geometry, according to our preliminary system, they are the objects whose properties are to be studied.

The first thing to be done is, not to *give* the notions attached to the words point, line, straight line, surface, and plane surface, for they exist already, but to take care that the ideas are attached to the right words. About the term point there is no difficulty; we need hardly warn the instructor not to use the definition of Euclid, but to proceed as follows. Instead of digging a pencil, or the end of a pair of compasses into the paper, and calling the visible surface so produced a point, let all the first points shown be made by drawing two intersecting lines slightly upon the paper with a hard and well-pointed pencil, using the hand only, and not the ruler or compasses. Having made several of these, the learner should be required to find the points in which they cut one another, by showing them with a fine needle. When he can do this, he should be allowed to try to draw a line through two or more points, either straight or curved, or composed of both species. A flat ruler should then be given to him, with which he should be shown how to draw a *straight* line. And here we must observe, that his notion of a straight line will probably be, one which is parallel to the upper and under edges of the paper. Thus he has been told that he

cannot write *straight* without lines, and so on. This misconception must be corrected by drawing lines over the paper in all directions with the same ruler, and applying the term straight to them all. The learner must be made to understand, that the line which comes off the ruler is of the same form in whatever position the ruler may be held, and that a line which is straight in any one position is so in every other; that what he has been accustomed to call a straight line, means a straight line in the same direction as the upper edge of the paper. As to defining a straight line or a plane surface, we think it had better be let alone, unless perhaps the definition ascribed to Plato, or one of his school, be called in as an illustration only, which is, that a straight line is that which can be so held before the eye, that nothing but a point shall be visible; and a plane surface, that which can be made to appear as a straight line in the same manner. But the plane surface may be illustrated by the definition of Euclid. Taking a plane, and also a piece of a cone, cylinder, sphere, or any other which may be at hand, the child may be shown that the edge of the straight ruler may be made to rest entirely upon the first in every direction, which is not true of any of the others. We may remark, that the usual idea of the word plane, is that which ought to be attached to the term level, or horizontal plane,—a misconception similar to that just mentioned with regard to the straight line.

The most serious difficulty in the definitions is that of the word *angle*, because it contains a notion hitherto almost unconsidered. The best substitute is the word *opening*. Several intersecting straight lines may be drawn, making acute, obtuse, and right angles, care

being taken that some of the longest lines shall contain very small angles, and some of the shortest very obtuse angles. Two of these sets being pointed out, the learner is required to say which lines open widest. Most probably he will fix upon those which appear to contain most space, or which have the longest lines. If this happen, cut out the angles from the paper, making the incision opposite to the angle curvilinear, as in the following diagram :—



Placing the larger angle undermost, lay the other upon it, so that the angular points B and A may be one over the other, and the line A C, as far as it goes, may lie under B D. This will be best done by using pasteboard, so that the under edges may be placed side by side on the table, the angles being held upright. There will then be no further difficulty as to which two lines open widest, or contain the greatest angle ; the notion of equal angles may be established in the same way. For schools, such angles might be cut in wood, by a common carpenter, and also some triangles, with moveable angles, as in the following diagram :—

Before proceeding further, the following propositions should be verified :—The greater angle of a triangle is opposite to the greater side ; a triangle, which has two

sides equal has the angles opposite to those sides equal; the exterior angle of a triangle is equal to the sum of the interior and opposite angles. Any one who is acquainted with the subject will see the ease with which these propositions may be submitted to ocular demonstration, by cutting off the angles from paper triangles.

The definition, given by Euclid, of a *right angle*, is the one which we should prefer. Translated into language fit for a child, it is this: the line A makes a right angle with the line B, when it does not lean to either side, or make the opening on one side greater than the other. This may be verified, as in the preceding page, when two lines, perpendicular to one another, have been drawn. There is what we consider an omission in the work of Euclid, though we are aware that it will not be looked upon in this light by many—it is that of angles which are equal to, and greater than, two right angles. It is desirable that the learner should be made to see the distinction between the part of a line and its continuation. For example, the line A B, and its part A C,

contain no angle, or coincide, while A B, and its continuation A D, make a greater opening than any angle considered by Euclid, and one which is evidently two right angles. This may be illustrated by taking a common pair of compasses, and opening them from the position in which the two legs coincide to that in which they form the continuation of one another. For fear, however, of having more to answer for than we intended, we must warn all those who teach, that a sharp pair of

compasses is a dangerous tool, particularly when opened as we have described, and in the hands of children. This instrument should always be handled with the most delicate touch, both on this account, and because no accuracy can ever be obtained by using it roughly. To return to our subject: any other line, A E, should be pointed out as making two openings with A C; one, most commonly known by the name of the angle C A E, and less than two right angles; the other, E A C, greater than two right angles. In illustration, it may be noticed, that the line A E, in our diagram, may revolve into the position A C, either from left to right, or from right to left. In the first case it describes the smaller angle just mentioned; in the second case, the larger. The beauty and generality of Euclid, Book III., prop. 20, are materially diminished by the absence of this convention.

We hold it essential, that the accurate use of the pencil and ruler should be one of the first things taught, in drawing straight lines only. As an exercise of this process, we propose the following verification of a simple proposition:—After the learner has been made to practise drawing straight lines from one given point (see page 97) to another, the lines being as thin as is consistent with their being distinctly seen, let him choose two points, A and B, and draw any number of lines in any directions through A, and two lines only through B, cutting all those which were drawn through A. The pair of lines through B will, therefore, form a four-sided figure with every pair that can be chosen out of those drawn through A, and the opposite corners of every such four-sided figure should be joined, giving the *diagonals* of them all. The diagonals of each figure in-

tersect in one point, giving as many new points as there are four-sided figures, all which points, if the figure be correctly drawn, will lie in the same straight line, which straight line will pass through B. A construction of this sort, in practised hands, is a very good trial of the straightness of a ruler, and such as many of those sold in the shops will not bear.

The preceding example, which contains nothing but the construction of straight lines, will serve as an exercise in that particular operation. The following, taken from Mascheroni's *Géométrie du Compas*, in which the ruler does not appear at all, but only the compasses, will furnish a similar test of accuracy in the use of that instrument. As we are writing for the instructor, and not for the pupil, we do not think it necessary to add the diagram. Take two points, A and B; it is required to find the middle point of the line A B without drawing that line, or using a ruler in any way. With the centre A, and the opening of the compasses A B, describe a circle. On this circle cut off B C, C D, D E, with the same opening of the compasses B A. With the centre B, and the opening B A, describe a circle, and also another with the centre E and opening E B. Let the two last mentioned circles cut one another in P and *p*. On the circle whose centre is B, beginning from the point *p*, take the opening B A three times, cutting off arcs *px*, *xy*, *yz*. With the centre P, and opening P B, describe a circle, from which cut off B M towards A with the opening P *z*. The point M is the bisection of the line A B. Of course, the whole of every circle need not be drawn; the eye will point out how much is necessary. When this construction has been made, the points A B may be carefully joined with

the ruler, and the point M ought to be upon the line A B, and in the middle of it.

To ascertain with what degree of accuracy the compasses are used for the measurement of lines, the simpliest method is the verification of Euclid III. 35, which involves the equality of the products of the segments of lines which cut one another in a circle.

The best definition of parallel lines, for our present purpose, is the appearance they present when drawn. It must be observed, that our object now being to impress isolated facts upon the eyes of the learner, no definition is so good as a figure; and it is quite sufficient that no mistake should be made in applying the common phraseology. Thus, instead of defining parallel lines, as those which would never meet, though ever so far produced, a definition which it is impossible to verify, let parallel lines be drawn, and let the student be required to verify, by measurement, the property that any third line makes equal angles with the two parallels. Thus, having drawn a line at right angles to one, he will find that it is also at right angles to the other; and having drawn several such, he will find that the parts of them intercepted between the parallels are equal. In our next article we shall show that it is almost immaterial what definitions are adopted in this part of the course.

Our object being to convey the knowledge of the facts of geometry, and to form a perfect acquaintance with, and readiness in the use of, its language, we now recommend that the propositions of the first four and the sixth books of Euclid should be enunciated with ocular demonstrations. And here we must observe that some of the more elementary properties have disadvantages in this respect, on account of their simplicity. For

example, with two obviously equal triangles before our eyes, we tell the learner that *if* two sides of the one are respectively equal to two sides of the other, and *if* the included angles are also equal, the triangles will be equal in every respect. In the meanwhile, he will have outstripped us; for seeing that the two triangles are equal, and hearing that, after all our words, we tell him nothing more than he knows, having also no distinct conception of the connexion between the hypothesis and its consequences, he will imagine we might just as well have said at once "Here are two equal triangles." To create the notion which we want to give proceed in the following manner:—Draw a straight line, and on it require the student to construct various triangles, which he will readily do. Continue this until he perfectly comprehends the proposition, "The triangles which have one given side in common are infinite in number." After this, with any radius, and one end of the given line as a centre, describe a circle. By taking any point of this circle as a vertex, the following may be established:—"There is an infinite number of triangles which have one side in common, and besides this a second side of the one equal to a second side of the other." Again, by drawing any other straight line from one extremity of the given line, and taking any point in this as a vertex, it follows that "an infinite number of triangles may be drawn which have one side and one angle in common." Now give the learner an angle formed in wood or pasteboard, so that the directions of two lines containing that angle may be found by drawing the pencil round its edge, and require him to draw two triangles of different sizes, having that angle, and also having a side of one equal to a side of the

other. This will be readily done; after which vary the question, and require him to draw two triangles which shall have that angle, and the *two* containing sides in one respectively equal to those of the other, and which shall have different third sides. This he will find, in a few trials, that he cannot do; and by similar steps, with regard to the remaining angles and the areas, he will come to a perception of the proposition of Euclid in the following somewhat more striking form:—"If two triangles agree in one angle and the two sides which contain it, it is impossible that they should differ in any respect." The same process may be followed in many of the more simple propositions, and it is for the instructor to consider, in every case, whether the proposition is more remarkable in what it affirms, or in what it denies, and to shape the enunciation accordingly. The following propositions, it appears to us, might be simplified by the preceding method:—

1. Axiom 11, which is, in fact, a proposition admitting of demonstration.

2. Book I. Propositions 4, 7, 8, 11, 15, 26, 33.

3. Book III. Propositions 14, 24, 26, 27, 28, 29.

4. Book VI. Propositions 5, 6, 7, 26.

The greater part of the remaining propositions are such as admit of simple ocular demonstration by common measurement. Among those which are of minor importance, or of none at all, we may name,

Book I. Propositions 2, 3, 7, 16 (included in 32), 17 (included in the corollary of 32), 39, 40, 44, 45, 48.

Book II. 7, 8, 9, 10, 11, 14.

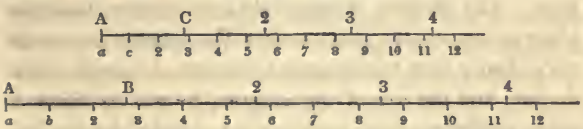
Book IV. 10, 11, 12, 13, 14, 15, 16. The constructions are better made by other methods.

Book VI. 25, 27, 28, 29, 30.

Three most important preliminaries, which it is necessary to treat in a different manner from Euclid, are the definition of proportion, the measure of an angle, and the area of a square or rectangle. With regard to the first, there are difficulties in the way, unless the learner has a tolerably correct notion of arithmetical fractions. Those who have not must omit all propositions of the sixth book; to the rest, the following definition may be given as a first step :—

Take a simple proposition out of the sixth book; the following, for example—that equiangular triangles have their sides proportional. Two equiangular triangles, A B C and *a b c*, are drawn, in which A B of the first is twice or three times, &c., the corresponding side *ab* of the other. By measurement, it will appear that A C is twice or three times, &c., the corresponding side *ac*. The pupil is then exercised in the following way :—If *ac* is contained three times in A C, how often is the *half* of *ac* contained in A C? How often is the third part of *ac* contained in A C? and so on. It will appear that, in the case under consideration, any part of *ac*, the fifth, for example, is contained in A C as often as the fifth part of *ab* is contained in A B; and also that *ac* is contained in twice A C, or three times A C, &c., as often as *ab* is contained in twice A B, three times A B, &c. Now take the same construction, drawing *ab* so as not to be contained an exact number of times in A B. It will still appear from measurement that any part of *ab* is contained as often in A B *with a remainder*, as the same part of *ac* is contained in A C *with a remainder*. For example, if A B contains the fifth part of *ab* seven times and something over, A C will also be found to contain the fifth part of *ac* seven

times with something over. This having been tried sufficiently, let the lines *ac* and A C be placed one upon the other, *a* coinciding with A, and let the same thing be done with *ab* and A B, and let them be carried on by the compasses as in the adjoining diagram, the larger figures above being placed at the end of multiples of the line denoted by large letters, and the smaller figures below denoting the same with respect to the small lettered line. This construction should be made as correctly as possible, and the successive points should be made by a small circle, cutting the line, and not by forcing the compasses into the paper.



It will be observed, on comparing the larger and smaller figures in both lines, that they run in the same order with respect to one another: for example, we find six times *ac* a little greater than twice AC; we also find six times *ab* a little greater than twice AB. Again, three times AB falls between eight times and nine times *ab*; and three times AC also falls between eight times and nine times *ac*. Such arithmetical conclusions as the following should also be brought forward. As twice AC is nearly six times *ac*, *ac* is nearly two-sixths of AC; similarly *ab* is nearly two-sixths of AB. Cases may be taken in which AB and *ab* have a simple common measure, in which cases one of the greater figures will soon fall on the same point as one of the lesser in both lines. The constant similarity of the way in which the greater figures are distributed among the lesser may be

made the ground-work of the definition of proportion: care being taken to show that whenever *ac* is any arithmetical fraction *nearly* of AC, *ab* is nearly the same fraction of AB. The preceding method may be introduced as a way of determining nearly what fraction a line is of another line. We must, however, leave the instructor to his own judgment, as to how far his pupil can bear anything beyond the first and simplest step.

With regard to our second preliminary, the measure of an angle, the proportionality of the circumference of a circle to its radius will be much more easily explained as a fact, than it will be afterwards deduced as an inference. The division of the circle into degrees needs no observation, except that, unless the learner be taught very clearly how to distinguish between the *angle* of one degree, and the *arc* of one degree, he will be liable to some confusion, which will not be mended by his finding it asserted in the books of analysis which he subsequently reads, that when the radius is unity, the arc of one degree, and the angle of one degree, *are the same things*. Instead of a protractor, which is at best but a clumsy instrument, he had better be furnished with a table of chords to every degree, and taught how to use it, taking the radius (which should be 100) off a common scale. It would also be well that he should form this table for himself for every ten degrees, to the same radius, dividing the circle by trial several times, and taking the mean of several of his determinations. This would be a practical illustration of a refined and useful process, and it would tend to fix notions of the value of repeated observations in his mind, when he came to compare his own single and average determinations with a better table. We need hardly instance the use

of the circle in giving accurate conceptions of angles greater than two right angles.

The way of finding the area of a rectangle is, like the doctrine of proportion, perfectly simple, when the sides of the figure can be expressed in whole numbers. There is no need to dwell on the way of showing that a rectangle whose adjacent sides are three and four inches respectively contains 3×4, or 12 square inches. There is some difficulty in passing to the area of the rectangle whose sides are $3\frac{1}{4}$ and $4\frac{2}{5}$ square inches. It must first be made evident, that the addition of any fraction of itself to *one* side only, adds the same fraction of the rectangle to the rectangle, which can be done, in simple instances, by construction. For example, the rectangle whose sides are 3 and 4 inches having the side 3 increased to $3\frac{1}{4}$, that is, having one-twelfth of itself added: the first rectangle, by the division of the side 3 inches into 12 parts, can be divided into 12 such strips as that strip by the addition of which the new rectangle is made. But the first rectangle is 12 square inches, therefore the second is 13 square inches; each of the strips being, though not in form, yet in magnitude, one square inch. This second rectangle being obtained suppose the side 4 inches to increase to $4\frac{2}{5}$ inches, or to have two parts out of 20, or one part out of 10, added to itself. By a process similar to the preceding it may be shown, that the second rectangle, 13 square inches, has also one part out of ten added to itself, or $1\frac{3}{10}$ square inches, giving for the whole $14\frac{3}{10}$ square inches. The sides being $3\frac{1}{4}$ and $4\frac{2}{5}$, or $\frac{13}{4}$ and $\frac{22}{5}$ inches, the arithmetical multiplication of these gives $\frac{286}{20}$ or $\frac{143}{10}$, or $14\frac{3}{10}$, the number of square inches just found: verifying the principle which the foregoing investigation is intended

to fix in the mind of the student, that the arithmetical rule of multiplication applied to the units or fractions of units in the sides, gives the square units, or fractions of square units, which are in the surface of the rectangle.

The preceding principles contain difficulties which it is needless to disguise; but when it is considered that the doctrine of proportion, the measurement of angles, and of the areas of rectangles, are the principal foundations of the application of arithmetic to geometry, it will appear that the trouble of explaining them clearly is not wasted. The difficulty is in the subject itself; the learner has not been accustomed to such considerations, and it is therefore hopeless to expect that he can avoid all perplexity. It would be easy to confine ourselves to the most simple view of the case: to consider nothing but equimultiples in proportion, or rectangles with whole numbers of units in their sides. But the time gained here would be more than lost when the student comes to the more complex forms of his propositions; and a judicious teacher will cast his eye beyond the present moment, and, though he may defer matters of minor importance, will not shrink from those of greater difficulty and importance when he knows that any neglect will oblige him to slur over future propositions, and leave them not only half finished, but with the idea in the mind of the learner that they are quite complete. To take a very common method of proceeding, let us suppose it has been explained how to find the area of a rectangle whose sides are expressed in *whole numbers*, and the rule 'Multiply the sides, or the units in the sides, together' has been obtained. The instructor neglects either to establish the rule for fractions, or even to mention the incompleteness of the pre-

ceding case, and the matter passes by. In some future lesson a rectangle occurs, whose sides are fractional, and there is a stoppage. The instructor says, 'You know what you did before; repeat the rule,' and the learner accordingly repeats it, and is made to *multiply* the fractions in the sides: having previously learned a rule which he has been taught to call *multiplication of fractions*. Here is an evident fallacy, being the assumption without proof of the following proposition:—If the answer to a question which contains whole numbers be correctly deduced from the multiplication of those numbers, then the same question, when fractions are substituted, is correctly solved by multiplying the numerators of the fractions for a numerator, and their denominator for a denominator. Though we have thrown aside for the present the reasoning which connects one proposition with another, we do not therefore say that it would be wise to introduce fallacies, or to encourage unwarranted assumptions, by making them preliminary to sound reasoning.

The whole of the propositions in the first four books which we have not marked as immaterial, may be divided into three classes: the first containing the problems; the second the theorems in which some equality is asserted which may be verified by cutting out some parts of the figure and laying them over others, such as that any angles in the same segment of a circle are equal. The third class contains those theorems in which areas are asserted to be equal to other areas, differing in form from themselves, though not in magnitude, such as Book I. 47, in which it is asserted that the sum of the squares on the sides of a right-angled triangle, is equal to the square on the hypothenuse. The first class of

these, the problems, should be carefully constructed by the student in the manner prescribed by Euclid, with the exception of the inscription of regular figures in a circle in the fourth book, which may be better done by the table of chords already mentioned, or *by trial*, which is a very good exercise in the use of the compasses. Of the second class we have said sufficient: of the third class, the principal propositions are Book I. 35, 43, 47; Book II. 12, 31; Book III. 35, 36. Our limits will hardly allow us to enter at full length into the ocular demonstration of these propositions; we will nevertheless shortly indicate some methods which will be found useful.

Book I. Prop. 32. If the three angles of a triangle be cut off and applied round the same point, the first and last segments of the sides will lie in the same straight line: or let ABC be a triangle, of which the greater angle is C (if the triangle be acute-angled, any angle may be chosen;) draw CD perpendicular to AB, and EF through E and F the middle points of CA and CB. Cut out the triangle, and double CEF over the line EF, so that C and D coincide: if BD and AD be then doubled, so that B and A meet in D, it will be found that the three angles of the triangle are so arranged as to show their equality with two right angles. The demonstrations of the corollaries of this proposition, as given in Euclid, are, or may be made, ocular.

Book I. Prop. 35, 43. The areas which are here called equal cannot be made to coincide; but it is evident in the demonstrations, that the same areas added to both form figures which *can* be made to coincide.

Book I. Prop. 47, may be demonstrated to the eye

in the following way: let ABC be the right-angled triangle, of which the right angle is at B. On AC describe the square AGHC (the letters go *round* the square) turned, so that the triangle ABC may fall *within* it. On AB, the larger side, take AD equal to BC the smaller side, and join DG: on GD take GE equal to BC, and join EH: produce CB to meet EH in F. Cut out the triangles ABC, ADG, GEH, and HFC, and give them with the remaining square EFBD to the learner as a dissected puzzle, which he is to put together into one square, and also into two squares side by side. He will soon find this out, and will see that the single square is that on the hypothenuse, while the two are those on the sides. To verify this proposition in numbers, when he has learnt how to estimate the area of a square, it will be desirable to have a method of finding right-angled triangles whose sides are whole numbers. The following is the most simple: take any two numbers (4 and 7), multiply each by itself (16 and 49); take the sum and difference of the last (65 and 33): these are the hypothenuse and one of the sides of a right-angled triangle: the other side is twice the product of the numbers first chosen (56.)

Book II. 12, 13. The simplest method of verifying these propositions is by means of numbers, and the following rule will find a triangle whose three sides, together with the perpendicular let fall on one side from the opposite angle, and the segments made by that perpendicular, are all whole numbers. Let ABC be the triangle, CD the perpendicular from C on AB, making the segments AD, DB. Choose any even number for the perpendicular CD, which has two even divisors; 8 for example, which is divisible by 2 and 4. Multiply

and divide it by one of the even divisors, 2 for example, giving 16 and 4. Take the half sum and half difference of these, giving 10 and 6. If the first be CB, the second is DB. Proceed in the same way with the second divisor 4, which gives 17 and 15. If the first be AC, the second is AD. The side AB is the sum or difference of AD and DB, that is, 21 or 9, according as we construct CDA and CDB on the same or opposite sides of CD; that is, according as we choose both the angles A and B acute, or one of them obtuse.

When propositions have been verified in the case of whole numbers, verification in some other case should be attempted by measurement and calculation. This will not be so satisfactory, on account of the errors which must arise in estimating fractions of the parts of the scale. Nevertheless, it should be attempted, and the source of error pointed out. It will be found that such numerical application will fix the proposition in the mind.

We shall now proceed to show how the reasoning of geometry may be taught, on the supposition hat the student is perfectly master of the language and facts of at least a large portion of the first four books of Euclid. Every beginner will not be competent to do as much as we have pointed out, but many will; and we are convinced that, by so doing, they will be prepared to look upon the reasoning of Euclid, as what it really is, one of the most admirable results of human thought, and not, as is often the case, to regard it as most unprofitable drudgery. If Euclid be usually ill-understood at first, it is because, with the usual quantity of preparation, one reading of the first six books is no more than is necessary to learn the terms and modes

of speech, and to acquire an indefinite notion that there is something to be learnt, and a sort of *aperçu* of the leading facts. These, we submit, ought to be known beforehand, if the reasoning part is to be made a source of enjoyment. We receive with more satisfaction the information that charcoal and the diamond, two well-known substances imagined to be distinct, are the same, than we should have done, had we only to regard the latter as a new product, arising from the crystallization of the former.

As we have already observed, the more important part of the study of geometry is the habit of reasoning which should be acquired from a science where all is absolute demonstration. If we should be thought to speak rather of what ought to be than of what is, it must be owing to something in the method of teaching which keeps the logic of geometry in the background, and substitutes for it an exercise of less improving character, which may be the mere learning by rote the phraseology of propositions. When we find, as it frequently happens, that by 'A is greater than B, and B is greater than C, *much more then* is A greater than C,' students imagine it to be proved that A is *much greater* than C, we think it evident that their attention has not been directed, in the least degree, to the nature of the connexion which exists between one part of a syllogism and another.

If we were to propose to ten students who, as times go, have read the first four books of Euclid, the following argument,—'Every equilateral triangle is equiangular, and an equiangular triangle may contain less than an acre, therefore an equilateral triangle may contain less than an acre'—we are convinced that nine out of ten would admit the conclusion without scruple, and

that of those nine not two would find out where the fallacy lay, even when the instructor assured them that there was a fallacy. The three propositions are evident truths: the falsehood implied in the little word 'therefore' passes unheeded, because that same word has never been anything more than a mere pleonasm in their previous course of *reasoning*. Finding the demonstrations employed threw no great light upon the matter, they preferred believing the propositions upon the evidence of their senses, which is the way by which most young persons gain the assurance which they have of the truth of the facts asserted. The reasoning was *said* over, that is, the angles and sides of triangles were repeated in endless confusion, mixed with a decent distribution of the words 'because,' 'by hypothesis,' and 'therefore.' To show that this is not a notion of our own, a mere march-of-mind complaint against existing institutions, we will again cite the editor whom we quoted in the former part of this article :—'Once upon a time a certain father, resolving not to be imposed upon by reports, determined to examine into his son's progress in this science, produced the book, and required him to demonstrate a proposition to which he referred : the young man, though unacquainted with the subject, taking courage from his father's ignorance, began very impudently in some such manner as follows :—Because the angle ABC is equal to the angle CBA, therefore the angle DEF is equal to the angle CEF, &c., ringing the changes upon sides and angles, until he had spun out his demonstration to a decent length, and then kept silence in expectation of his father's opinion, who, with a grave and important countenance, remarked, "This is what we call demonstration."'

Geometry, as it is usually studied, does not *teach* the principles of reasoning, but *applies* them, supposed to be already known, to the consideration of the properties of space. There is, therefore, no reason to presume that all who learn geometry will learn to reason correctly, except in so far as such exercises as the propositions of Euclid must be supposed, in some degree at least, to create habits of thinking. They do so to a certain extent, but we need not, therefore, imagine that all is done which can be done. If the pupil pays no attention to the grounds on which the *reasoning* is founded, he will not gain all that ought to be gained. The principles on which geometrical propositions are established belong to the totally distinct and equally simple science of logic; and since geometry without logic would be absurd, it is desirable that the principles of the latter science should be studied with precision and method previously to employing them upon the former.

The forms of logical reasoning have unfortunately fallen into disrepute proportional to the extravagant exaggeration which was formerly made of their value. Considered merely as a part of grammar, the distinction is both useful and interesting between a sentence which is untrue in itself, by its own construction, and one which is true or untrue according to the correctness of the facts stated in it. This branch of grammar is most essential for young persons, because, in the details of it, many of the sources of incorrect reasoning will be discovered and stopped, by a process, which, after all, amounts to little more than pointing out the force of each word in the sentences, 'A is B' and 'A is not B.' It is not absolutely necessary that syllogisms should be formally defined, and the various inaccuracies called by their standard names; and those who think the very

word *logic* smells of the schools, may, if they please, call it 'construction of sentences,' or the 'analysis of the connexion of the clauses of a sentence,' or anything else they please, provided only they teach something that shall give the student of geometry a knowledge of the components, which he will afterwards be required to put together. We proceed to detail the method by which we should propose to do this. The main illustration has been used by Euler, in his letters to a German Princess.

Let a number of simple figures be cut out in paper; three sorts will be sufficient, which may be triangles, squares, and circles. Let these be of larger and smaller sizes, so that several of the smaller may be placed on one of the larger without touching; or it may be considered preferable to cut them out in wood or pasteboard, and use them to form similar figures on paper by drawing a pencil round the edges. It is obvious that every species of simple proposition, which confines itself to asserting or denying one thing of another, in whole or in part, will be similar to one or other of the four following:—

Every point of the circle is in the triangle;

No point of the circle is in the triangle;

Some points of the circle are in the triangle;

Some points of the circle are not in the triangle;

and by interchanging the words circle and triangle, every possible variety of assertion which can be made respecting the two is obtained. Each of these cases can be palpably represented by one of the circles and triangles, so that a proposition which is asserted to follow from any one of them, or from two put together, may be immediately verified or rejected. The instructor then proceeds as follows:—Taking one of the above-

mentioned assertions, for example, the first, 'every point of the circle is in the triangle,' he explains this to mean that the whole circle falls within the outline of the triangle, and that every point of the circle is considered to be the same as that point of the triangle over which it falls. He then distinguishes the different parts of the sentence, which are the *subject* or thing spoken of, the points of the circle—the manner in which they are spoken of, generally or universally, *all* the points of the circle, in opposition to particularly or partially *some* of the points of the circle—the *predicate* or object with which they are connected, 'the points of the triangle,' —the *copula* or species of connexion asserted, which, in this case, is agreement affirmatively expressed, 'every point, &c., *is* one of the points, &c.' The learner is then required to make similar assertions of other things which he knows to be true. If he hesitates he may be assisted with such propositions as the following:—'Every part of London is in England;'—'Men are liable to error,' that is, 'Every man is, &c.' or 'All men are, &c.'

Now let the extent of this form of proposition be examined. It will not appear evident at first that the *converse* (a term generally misunderstood by beginners) does not follow from it. Students of geometry are mostly in the habit of dealing with propositions, the converses of which are found to be true; all definitions, for example, and such general propositions as this, 'all equilateral triangles are equiangular.' From the frequent occurrence of similar cases, they are led to admit, at the first question, that if every A is B, every B is A, and if asked for the reason of their notion on this point, will bring forward* one or two such examples

* That is to say, the better sort of heads bring forward such

as we have alluded to, thereby giving a practical proof of their belief in another fallacy, that because some converses are true all are so. But when their assertion is put to the test by such a proposition as 'all birds are animals,' they immediately see and laugh at the strange conclusion to which their own principles lead them, viz., that 'all animals are birds;' but still they are here struck, not by the defect in the method of reasoning, but only by the absurdity of the conclusion. This cause of error might be eradicated if the pupil were accustomed to state various propositions, with such circumlocutions as would show the partial manner in which the predicate enters; for example, 'every point of the circle is a point of the triangle,' that is, the whole circle is a *part* of the triangle—among all the points of the triangle will be found all the points of the circle, without denying that there may be points of the triangle which are not points of the circle. 'All men are liable to error,' that is, all *men*, but all animals too may be, and for anything to the contrary contained in the assertion, inanimate beings as well. At the same time, it must be explained, that the converse, though not asserted in the preceding, is not denied; that though 'all equiangular triangles are equilateral' does not *follow* from 'all equilateral triangles are equiangular,' it does not *contradict* it. Hence the necessity of proving Prop. 6. Book I., and its admissibility when proved. In fact, if some such explanation be not adopted, there are several fallacies which are fostered and not eradicated by the study of Euclid.*

The other general forms of assertion may be treated

instances: nine out of ten say "*Of course* if every A is B, every B is A."

* We have seen so many instances of the kind, that we strongly suspect that *Euclid, as studied, does as much harm as good.*

in the same way; and we much wish that it was in our power to recommend to the teacher any work * on which he might model his instructions. As it is, we can only briefly indicate to the followers of the usual routine a road we should be glad to think many have already struck out for themselves.

By writing down the various ways in which it may be expressed, that the circle is or is not, wholly or in part, contained in the triangle, or the triangle in the circle, eight distinct propositions will be obtained, and as many more relative to the circle and square. From these sixteen propositions one may be selected out of each set in sixty-four different ways, so that there are sixty-four preliminary inquiries, each of which may furnish an exercise of reasoning, with at least as much advantage as so many propositions of Euclid would be without them. Each of these should be entered into separately, and examined for the purpose of finding out whether any third proposition respecting the triangle and square, independent of the circle, necessarily follows from them. Then other similar propositions should be formed upon other subjects, and the same analysis applied. As an example, suppose we consider,

Some of the circle is in the square;

None of the triangle is in the circle;

is any part or all of the triangle necessarily in or out of the square, or is the preceding combination equally consistent with all the cases. On drawing the figure, it will be seen that nothing positive follows from the pre-

* This subject will be found, with a little more detail, as applied to geometry, in the Society's treatise on the 'Study and Difficulties of Mathematics,' Chap. XIV. For general logic there is no work in our language at all comparable to that of Dr. Whately.

ceding assertions ; that both may exist consistently with the triangle being either wholly or partly in or out of the square, and that the only relation inconsistent with the two preceding is that which places the whole square in the triangle. The only deduction is, that some of the square is not in the triangle. A verbal analysis of this conclusion should now be sought, and it may be found in the following reasoning. The first assertion states, that some of the circle is common to the square; we must, therefore, stand prepared to admit that anything which can be asserted or denied of all the circle as to position, can be asserted or denied of certain points of the square. But by the second assertion it is denied that the triangle and circle have any points in common, consequently there are certain points of the square which are not in the triangle. This same reasoning should now be applied to other instances of the same form, drawn from various subjects, on which we do not think it necessary to dilate. To take an example from among those combinations which are without conclusion, —let some of the square be in the circle, and some of the triangle not in the circle. This will be found by trial to be perfectly consistent with either of the two, the triangle or square being wholly or partially contained in the other. To make this intelligible, the student must be made to understand that the phrases of common conversation are stripped of some of their implied meaning in all strict reasoning, and most particularly in that of geometry. The literal extent of the fact stated is all that is allowed, nor must anything be concluded from one simple proposition. For example, if in ordinary conversation we say that some men have a mechanical genius, it is always implied that the rest of mankind

have not the same, or it is considered as signifying that some men, and some men *only*, have that endowment. And by the word "some" is generally understood the smaller number, in opposition to the greater. None of this is supposed to hold in geometrical reasoning: to assert that some equilateral triangles are equiangular is perfectly correct, though, at the same time, it is true that all equilateral triangles are equiangular. In the same manner, to avoid the necessity of repeating two propositions instead of one, the word "some" is considered as standing for one, as well as for more than one. When, therefore, we say, that "some of the square is in the circle," we mean that one point at least of the square is in the circle, or it may be the *whole* square. But at the same time, though the truth may be more general than the proposition, the conclusion must not be so.

Returning now to the proposition given, the student must be made to see that no two assertions can give us the right to make a third, unless there is something common to both, expressed in strict reasoning, but often only implied in ordinary conversation. In the pair of propositions which we are now considering, namely, that "some of the square is in the circle," and "some of the triangle is not in the circle," we can only say, that a particular part of the triangle (that which is out of the circle) has nothing in common with a particular part of the square (that which is in the circle), which may be true, whether the one is wholly or in part contained in the other. Again, from the propositions, "some of the circle is in the triangle," "some of the circle is in the square," nothing can be drawn, for no deduction can follow, unless there is something in common in the two assertions which may be made to furnish the means of

comparing the two. Here, though the word circle is mentioned in both, it is partially mentioned; the "some parts" of the first may not be the "some parts" of the second; at least it is not so expressed, and is therefore not to be assumed. We should recommend that the sixty-four possible combinations of propositions above alluded to should each be separately considered, and either a deduction drawn, or a reason against drawing one pointed out. This seems to us perfectly necessary, but will not universally appear so. But certainly either the beginner is competent to detect the truth of each instance immediately, in which case a couple of hours will suffice for the whole, or there are some combinations which he does not understand, and then we presume it will be universally admitted that attention should be paid to these. Is so much time to be spent on mere etymology, and accurate combination of singulars with singulars, and plurals with plurals, and this, too, when practice would produce a sufficiently correct habit; and is no attention to be paid to that structure of a sentence on which its truth or falsehood depends, so far as structure can influence one or the other, when all people must reason more or less, and very few do it correctly? It matters little, as we have said before, whether the language of the schools be adopted or not; those who know it can use their discretion, and those who do not may be informed that correct logic is in their power, and if they will adopt the preceding process, must be a necessary result of their experimental researches on the structure of a simple argument. Of course we confine the term logic to its strict meaning, not supposing it to have any reference to the truth or falsehood of assertions themselves, but only to the circumstances

under which two of them give us a right to deduce a third.

The preceding course having been adopted, it remains to put it in practice in following the order of Euclid. The definitions claim the first place; and these should be explained without the ambiguity which commonly attends them. As they usually stand, there is nothing to distinguish them from the propositions which follow. It must be remembered that the perversity of human nature, we suppose, lends beginners a really wonderful tact in choosing the wrong idea, if there be two to choose between, that is, in every possible case. Hence "a parallelogram is a four-sided figure, whose opposite sides are parallel," is too nearly allied in form to "the opposite angles of a parallelogram are equal." The development of the first should be, "let it be agreed to call every four-sided figure whose opposite sides are parallel, by the name of *parallelogram*, so soon as it shall have been shown that such figures can be drawn, and let no other figures be called by that name." The indefinite idea which exists in the mind of a beginner as to the distinction between the component parts of a demonstration, must be well known by all teachers who have any clear ideas on the subject themselves. The first answer, when pressed on any point, is, "Of course it is so," which must always be interpreted to mean that belief outstrips knowledge. But when further questioned, the useful terms "by definition," or "by hypothesis," are applied, according to which of the two hard words first comes into the memory. To avoid this, it would be advisable to draw a perpetual verbal distinction between the application of a definition and the deduction of a consequence: thus, instead of allowing the pupil to

say, "A B is parallel to C D, and A D to B C, *therefore* A B C D is a parallelogram," it might be worded thus, —"A C is parallel, &c., that is A B C D, being a four-sided figure whose opposite sides are parallel, is one of those to which we have agreed to give the name of parallelograms." The mischief arises, in a great measure, from the mixed character of our language, which, instead of coining words as they are wanted, runs to an ancient tongue for the way of expressing the most common ideas. Thus we are not permitted to say lines run "side by side;" the idea must be expressed by the Greek word "parallels, *παράλληλα*:" nor must there be a "parallel-sided figure;" we again have the Greek "parallelogram, *παραλληλόγραμμον*." Hence the fallacy, noticed by Dr. Whately, of supposing that an assertion is proved by repeating it in other words, borrowed from another language, is never out of the mouths of beginners in geometry.

There is no difficulty in the "axioms," except in the Greek name, which is apt to convey a notion of mysterious power, and except in the celebrated axiom by which the properties of parallel lines are established. The pupil who has gone through the preparatory system of logic which we have recommended, can be easily made aware that all strict reasoning consists in the comparison of two simple assertions, and the deduction of a third. It will be evident that there must be some assertions with which to begin, and as these can have no demonstration, they should require none. With regard to the axiom on parallel lines, we may refer the readers to the Journal of Education, vol. I. p. 276, and vol. II. p. 341.

The pupil now comes to the study of the propositions prepared with a knowledge of the facts of which he is about to establish the connexion, and some idea of the technical part of the reasoning with which he is to be made conversant. We would not yet recommend that he should be thrown at once into the chain of propositions. We think he will more clearly see the nature of the step which he is about to make if two known results, of which one is easily deduced from the other, are first connected as a specimen. For example, suppose it known that the angles at the base of an isosceles triangle are equal, and also that the exterior angle of a triangle is equal to the sum of the interior and opposite angles. Suppose it also indisputable, that if A and B be respectively double of C and D, the sum or difference of A and B is double of the sum or difference of C and D. It can thence be immediately proved that the angle at the centre of a circle is double of the angle at the circumference, and that all the angles in the same segment are equal. These we suppose to be also known facts, our object being to impress on the mind of the pupil that one known fact may be connected with another, so that the second, if not known, might have been found out by means of the first. The reasoning will then stand thus:—If it be true that the angles at the base of an isosceles triangle are equal, and also that the exterior angle of a triangle is equal to the sum of the interior and opposite angles, then it follows that the angle at the centre of a circle is double of that at the circumference, &c.; so that the last proposition is proved so soon as the two first shall be proved. A few instances selected for their simplicity, the facts contained in them not being of the most self-evident character, would open the subject in a more striking way, than the (to beginners) most incom-

prehensible superfluity of demonstrating that from the greater of two lines a part can be cut off equal to the less.

This brings us to the postulates, or problems which are treated as axiomatic.* The student should be told that geometrical demonstration consists, not only in employing correct reasoning upon things which are in their own nature self-evident, but in employing as few of the latter as possible. The ruler and compasses should now be given to him, the former not being divided into a scale. The circle having been defined, he is told that the only use allowed to be made of the compasses, is to draw a circle with a given point as a centre, and the distance between that given point and another *given* point as the radius. As an illustration, the instructor draws two lines, and gives the compasses to the pupil, requiring him to cut off from the greater a part equal to the less. The pupil accordingly measures the smaller line, and is about to transfer the compasses to the greater, when the instructor interrupts him, shuts the compasses, and tells him that he is only to draw circles with them, but must not transfer any length, that is, must close them the moment he takes them off the paper. This appears to the student a perfect contradiction: on which the instructor goes through the process of the second and third propositions of the first book—closing the compasses every time they are removed from the paper, and calling the attention of the student to this circumstance each time it occurs. To the question, whether it would not be much more simple to transfer the length in the common way, the answer is, that it would be so in prac-

* This is the definition now usually given of a postulate; but we believe that the arrangement of Euclid has been altered.—See *Penny Cyclopædia*, Article AXIOM.

tice, but not in reasoning: that it is the object of the latter to be content with as little as possible in the form of assumption; and since it can be proved that with the compasses as a means of drawing circles *only*, and an undivided ruler, a line equal to the less can be cut off from the greater, it is considered right not to take the latter for granted, on the principle of dispensing with every assumption which is not absolutely indispensable.

The treatment of the first three propositions in this manner is a most advantageous opening of the subject, because it must give the pupil a clear idea of the very close nature of the reasoning which will be expected from him. What license can be allowed in a science where it is not taken for granted that from the greater of two lines a part can be cut equal to the less? In the common method of *saying* the propositions the very contrary effect is produced: the pupil is not made aware of the limited nature of the assumptions, which render the third proposition a real *consequence*: he imagines that a cumbrous machinery is put in action to prove what has been virtually assumed, and his inference, and a very just inference, is, that anything which comes after might as well have been assumed as proved. Not that he definitely maintains this; but he acts upon it in the degree of attention which he gives to succeeding propositions. The book most in use in this country, by which the elements of geometry are taught, is Simson's Euclid. The only fault that can be found with this translation is its occasional inexpressive and even confined method of rendering the Greek, by too close an adherence to a literal version, and its preserving the unmeaning repetitions of the original, which, however excusable in Euclid, who wrote against objectors, of whom there were many in his day, is useless and

tedious for the purposes of elementary instruction. We may add that it abounds in Hellenicisms, where common English would better have served the purpose; but this is also a fault of the preceding Latin versions. Will it be believed, that there is at least one *Greek* word in the Latin versions and in Simson which is *not* in the original? That which we call an "axiom," which will make our readers give Euclid credit for the particular use of the word "ἀξίωμα," is by him called "κοινη ἐννοία," two common words, implying "that which is in the understanding of every man." We should recommend all instructors to get rid of as much Greek as possible, and also of many superfluous phrases. For instance, "if there be two triangles which have two sides of the one equal to two sides of the other, *each to each*, &c." The phrase in italics is not an English idiom, but the literal translation of the Greek ἑκατέρα ἑκατέρᾳ: it conveys no meaning to a person unaccustomed to it, and requires a definition itself. Nor indeed is it easy to express the idea of this equality in a condensed form: the word "respectively" is sometimes employed, but this is not a good term; we have known a pupil assert that AB and CD were "respectfully" equal to EF and GH. Those who do think, frequently imagine we mean that the sum of AB and CD, is equal to that of EF and GH. We should recommend it to be said, "If two triangles have one side of the first equal to one side of the second, and a second side of the first equal to a second side of the second, &c." Again, it is not necessary to repeat the verbal enunciation of a proposition every time it occurs in those which succeed. For instance, if it should happen that two sides and the included angle are respectively equal in two triangles, if the pupil cannot be then trusted to

point out which other parts are equal "each to each," he does not become more fit to do so after muttering "therefore, the bases or third sides are equal, and the other angles are equal, each to each, namely, those to which the equal sides are opposite." We make no apology for insisting upon such matters; they create confusion.

With the knowledge which we have supposed the pupil previously to acquire, he will have no more difficulty in putting a proposition in a syllogistic form, than in understanding the reasoning. We have proposed a method in the article already cited, vol. II. of the Journal of Education, by which, when the pupil has had a little previous training in the syllogistic forms, the strictness of the method may be relaxed*. If to this be added, that no proposition should be passed until the learner can give the demonstration with different letters from those used in the book, or, which will be still better, with numerals instead of letters, and also with the figure drawn in any manner upon the paper, we should think a very sufficient check would be provided against the study of geometry being nothing but an exercise of memory.

The most serious embarrassment in the purely reasoning part is the *reductio ad absurdum*, or indirect demonstration. This form of argument is generally the last to be clearly understood, though it occurs almost on the threshold of the elements. We may find the key to the difficulty in the confined ideas which prevail on the modes of speech there employed. Let the student return to his primitive forms of assertion, and first ascertain which are contradictory, that is, taking

* See also the treatise on the "Study of Mathematics," Cap. XIV., for an example of both methods.

them in pairs, which two are so connected that both cannot be true, but one must be true. Let a careful distinction be made between those which are *contradictory* and those which are *contrary*, that is, which cannot both be true, but which may both be false. Thus, that "all equilateral triangles are equiangular," and that "some one equilateral triangle is not equiangular," are contradictory; but the contrary of the first is "no equilateral triangle is equiangular." This distinction had better be not only explained, but, so to speak, also made fast to the terms employed; the want of it may create as much confusion in geometry as in common conversation, one of the prevailing fallacies of which is the misapplication of these two ideas. The learner can now see that it is the same thing whether we prove a proposition, or disprove the contradictory proposition, for one of the two must be true. Now let the following method of expression be explained: "If A is B, C is D," using various instances, as in the preceding illustrations. This is not a syllogism, but a method of stating that there is an argument or chain of arguments, which, it is admitted, only want the proposition "A is B" added to their number, to complete the proof that C is D. Now, though it does not follow that if we disprove "A is B," we therefore disprove "C is D," because that which might follow from certain premises, if true, may also follow from others which *are* true; yet it does follow, that if we disprove "C is D," we disprove "A is B," for if A *were* B, C *would be* D. To suppose that a false proposition could be legitimately deduced from correct premises, would be a contradiction: if, therefore, a false proposition be deduced from premises all of which, except *one*, are true, that one, must be false. This is the

method of Euclid in indirect demonstration, as we shall show by putting the first case in which it occurs into the form in which it might be taught; substituting only the deduction of the corollary instead of the proposition, as the necessary phrases are thereby rendered more simple. It has been proved, and is admitted, that all equilateral triangles are equiangular, which is to be remembered throughout: it is to be shown that all equiangular triangles are equilateral. He who admits the first and denies the second, maintains that the first, and a proposition contradicting the second, may be true together: that is, he affirms that "some one equiangular triangle is not equilateral" may be true. The proposition of Euclid may then be thrown into a direct form as follows: "If any one equiangular triangle be not equilateral, then a whole is equal to its part," which is accordingly proved by the assistance of the admitted proposition. But the whole is greater than its part; therefore it is false that "some one equiangular triangle is not equilateral," that is, the contradiction, that "all equiangular triangles are equilateral, is true. It would be a good exercise to accustom the student to add indirect demonstrations to some of the direct demonstrations given by Euclid, as also to prove simple derivative propositions of such a form as this—"If two triangles have two sides of the one respectively equal to two sides of the other, but the included angles *unequal*, the remaining sides will be *unequal*, &c."

On the question whether the fifth book of Euclid, which is on proportion, can be made intelligible to beginners in general, we must suspend our opinion: we are very certain that it is not so to nine out of ten at least. We may perhaps resume this subject at a future

time; but as it is, we can only recommend instructors either to reject this book, and substitute the numerical definition of proportion, or, if they retain the book, to make the numerical definition accompany it. Many will not agree with us in the first recommendation, and we feel, as much as they do, the *hiatus* which would be made in the system by attending to it. But surely it is no compensation to the pupil for an employment of time which brings in no knowledge, (which is his case if he read the fifth book without understanding it,) that his instructor can appreciate the superior completeness and rigour with which all the demonstrations of the sixth book might be given, if the student could only comprehend that which he does not comprehend, namely, the fifth book. We would say to all, teach the fifth book, *if you can;* but we would have all remember that there is an *if.*

We now come to solid geometry, which we may observe is seldom or never taught before plane trigonometry: that is, a purely conventional arrangement has placed a very easy part of the subject after one of much greater difficulty; so that, in fact, access to the easier part is practically forbidden to all who do not first master the harder. The propositions contained in the first and second books are sufficient for the establishment of as much of the eleventh as is necessary for the purposes of spherical trigonometry, that is, of the first elements of astronomy; and the same pains which are taken with the fourth book, which is of very little use, would, if applied to the eleventh, most materially increase the power of the student to comprehend popular works on physics.

The main difficulty is one which is not in the subject,

but in the manner of treating it, namely, the substitution of drawings upon paper instead of the solid objects which are considered. Yet a few pieces of card, or even of the very paper on which the student looks with despair at right angles which are acute, and lengths the relative magnitudes of which have changed places, would be sufficient for the formation of *bonâ fide* prototypes of these perspective anomalies. We should like to know to how many mathematical teachers *per cent.* it has occurred, instead of drawing one plane inclined to another on a paper, to fold the paper itself, and place the two folds at the required angle? Would it give too much trouble? Does the pupil *say* his proposition as well without it?

The eleventh book of Euclid may, in our opinion, be abandoned with advantage in favour of more modern works on solid geometry, particularly that of Legendre, which the English reader will find in Sir David Brewster's Translation. If Euclid be adhered to, the first twenty-three propositions of the eleventh book are sufficient for common purposes. We need hardly repeat, that the ocular demonstrations should be made to precede all others, which cannot, of course, be done without lines which are *really* in different planes.

So long as geometry is made a mere exercise of memory, it is idle to expect that the pupil should make any step for himself in the solution of a problem which is not in the book; and as there are no *rules* by which such a thing can be done, we find accordingly that this is an exercise almost unknown in the geometrical classes of schools. But supposing the pupil to be taught on a rational system, there is nothing to prevent his being tried with easy deductions from time to time, except the

difficulty of procuring the problems in cases where the teacher cannot invent them. The works of Messrs. Bland and Creswell, published at Cambridge, bearing the titles of "Geometrical Problems," and "Deductions from Euclid," contain problems perhaps of too difficult a cast; but from them a judicious teacher might select some which would suit the capacity of his pupils. Previous to this, the pupils should have been accustomed to retrace the steps of the several propositions of Euclid from the end to the beginning, whenever this inversion will not affect the reasoning. This will accustom them to the analytical method, by which alone they can hope to succeed in the solution of problems. But great care must be taken not to introduce sophisms in this reverse process. For example, in the forty-seventh proposition of the first book, it is shown that the square on each side of the right-angled triangles is equal to one of the rectangles into which the square on the hypotenuse is divided. The concluding argument is therefore of this form: A is equal to B, and C is equal to D; therefore, the sum of A and C is equal to the sum of B and D. Assuming the result, that A and C together are equal to B and D together, it cannot, therefore, be assumed that A is equal to B, and C to D, but only that if A be equal to B, C is equal to D. Of all the exercises which we have proposed, this is the one which requires most care on the part of the instructor.

Our readers will see that we have throughout advocated the union of the forms of logic with the reasoning of geometry. We are convinced that it would be advantageous to make the former science systematically a part of education. If we except Oxford, there is no place in this country where it is still retained; and unfortunately

for the study, it is there more an act of memory about things called moods and figures, than an exercise of reasoning. What we have proposed would tend to improve the indefinite straggling form in which the reasoning of Euclid is presented to the young, and would provide a safeguard against the many misconceptions to which it gives birth. We have said nothing of the other advantages of logic, as they have no relation to the subject of this article.

ON MATHEMATICAL INSTRUCTION.

By A. DE MORGAN.

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It is matter of general remark that mathematical studies do not yield that pleasure to the young which the more intelligent and well inclined among them derive from every other part of their education. If the opinions of a number of youths could be collected, at the period when their education is just completed, it would be found that, while nearly all profess to have derived pleasure from their classical pursuits, the very name of mathematics is an emblem of drudgery and annoyance. In saying this we are not speaking of the Universities, in which the choice of studies is so far left to the taste of each individual, that no one can have those feelings against any particular study which arise from the remembrance of its having been forced upon them. Our remarks apply to the hundreds of schools with which the country is studded, where, in fact, the great majority of the educated portion of the community receive the knowledge which entitles them to be thus styled in most of which something is taught under the name of mathematics, bearing much the same likeness to an exercise of reason that a table of logarithms does to Locke on the Understanding. Honourable exceptions are arising from day to day; and those who guide the

remainder will, if they are wise, look out in time, and see with what favourable eyes the world regards any well-regulated attempt to improve the system. Why are so many proprietary schools erected? The reason is, that parents, who have neither time to choose nor knowledge to guide them in the choice of a place of instruction for their children, find it easier to found a school, and make it good, than run the doubtful chance of placing their sons where they may learn nothing to any purpose. We propose in this article to make some remarks on the manner of teaching mathematics as it is, and as it ought to be.

A very erroneous idea prevails with regard to the object in view, in making mathematical studies a part of education. There are places in abundance where book-keeping is the great end of arithmetic, land-surveying and navigation of geometry and trigonometry. In some, a higher notion is cultivated; and in mechanics, astronomy, &c., is placed the ultimate use of such studies. These are all of the highest utility; and were they the sole end of mathematical learning, this last would well deserve to stand high among the branches of knowledge which have advanced civilization; but were this all, it must descend from the rank it holds in education. It is no sufficient argument for the introduction of such pursuits that their practical applications are of the highest utility to the public, and profitable to those who adopt them as a profession. The same holds of law, physic, or architecture, which, nevertheless, find no place among the studies of the young. It is considered enough that the lawyer should commence his legal pursuits when his education in other respects is completed; and so would it be with him whose calling requires a knowledge of mathematics, were it not that an important

end is gained by their cultivation, which is quite independent of their practical utility,—viz., the exercise of the reasoning powers. It is well known, that mathematical demonstration has acquired the name of certain, on account of the simplicity and perfect admissibility of the principles assumed, and the strictly logical nature of the steps by which conclusions are deduced from these principles. The results are also, in many cases, matters of common experience, by the application of which the reasoning may be confirmed. The same species of logic is used in all inquiries after truth; but the broad distinction between mathematics and the rest is, that the data or assumptions of the first are few, undeniable, and known to the student from the beginning; no question can be raised upon them which in any way affects the disposition to admit them, and they require no induction from facts which can be disputed. The student can then perceive more clearly in these studies than in any others what is reasoning and what is hypothesis; he sails along a coast, of which all the points are well laid down, that he may be able to use the experience there gained in future voyages of discovery.

The actual quantity of mathematics acquired by the generality of individuals is therefore of little importance, when compared with the manner in which it has been studied, at least as far as the great end, the improvement of the reasoning powers, is concerned. On looking at the question in all its lights, we might be tempted to say, let every one learn much and well; well, in order that the habits of mind acquired may be such as to act beneficially on other pursuits; much, in order to apply the results to mechanics, astronomy, optics, and many other sciences which can never be completely understood without them. But considering that

the great majority of youths have not time to devote both to the subject and its applications, and cannot therefore hope to be able to attend to the different branches of *mathematical* physics, the next point is to secure a habit of reasoning in preference to the knowledge of a host of results. The latter is preferred in most of our schools, and for this reason, that ninety-nine parents out of a hundred are more likely to ask their sons, How *many* books of Euclid have you read? How *far* have you got on in algebra?—than—In what manner have you studied? Do you understand what you have read? It is common enough for a boy to have acquired arithmetic by rule, six books of Euclid by rote, the greater part of Bonnycastle's Algebra by rule, and plane trigonometry in the same way, with just enough of the use of a table of logarithms to secure him against working any question with correctness. All this, if well learnt, would constitute a respectable portion of mathematical knowledge, and would enable an intelligent pupil, when the day arrives in which he begins to see the value of knowledge, to proceed in his studies without the aid of a teacher. But if we proceed to examine the manner in which this is gained, we shall in far too many cases establish the truth of the following sketch, which we believe to be a fair representation of the manner in which mathematical science was taught in our time, and it is to be feared is still taught to a great majority of those who commence this study.

The child learns from his nurse or his mother our method of representing numbers, by a plan of teaching which makes two symbols such as 16 and 25 nearly as independent of one another in his head as the ideas attached to the words "book" and "steam-engine."

When he arrives at school he is taught to *say* the table of numeration, and then proceeds through a number of rules, that is, directions to put figures together written in a book, with names at the head of them, such as multiplication, division, &c., which, if he understand, it is well, but if not, nobody cares. Some of these rules are so unintelligible, that were it not for an example at length which usually accompanies them, they would be equivalent to as much Hebrew. It is a fact that in some treatises not yet out of date, the inverse rule of three is defined as the rule where "less requires more, and more requires less." As to the reasons for the rules, the pupil cannot trouble his head (to use a common term for that much-avoided operation, thinking) about them, not knowing whether there are any at all, or whether the rules themselves came from the moon, or are a constituent part of that wisdom of our ancestors about which he sometimes hears. Should there be any natural defect in his mind, owing to which he finds it difficult to produce a correct result, knowing neither what he is to do, nor how to do it, there are several approved methods of proceeding. The best of these, unfortunately now somewhat exploded, is a flogging; which works on a principle recommended by physicians, of curing a disorder in a part which cannot be got at, by producing one in another which can. Next to this comes the method of keeping the patient from all recreation until he has done what is required of him, it being considered the same thing in the end, whether he cannot work for want of means, or will not from want of application. It has been suggested to teach the principles involved in the rules, and thus to render the pupil their master instead of their slave; but to this plan, indepen-

dently of its being an innovation, there are grave objections. Many instructors, if placed in the temple of truth, would be obliged to ask, "How shall I teach what I do not know?" Others would say, "All I have to do at present is to look at the pupil's work, and compare it with the key which I have locked up in my desk; should I begin teaching principles and all that, there would be no end of troublesome questions." In this last idea is much of the secret of the system. It works well, whatever the pupils may do, because, like the grammar and dictionary instruction in Latin and Greek, it saves the *teacher* a world of trouble. We remember to have seen a rule-book of algebra which recommended itself to the masters on the ground of saving them from being "pestered with questions." But to return—the *sums* as they are called, when, after many a correction, they coincide with the master's key, are carefully copied into a book, each with Qu. at the beginning and Ans. at the end, with red-ink lines in the places which taste points out; and this goes home at the vacation with the young gentleman, a triumphant proof of his progress, showing the delighted parent that his hope is *in* "compound multiplication," or, if he be a genius, *in* "discount," or "barter." This has been done in three years (we speak from knowledge), which, considering that the last rules consist in dividing a sum of money into parts, and taking some of those parts, is not such bad progress. In this way is the pupil driven through some dozens of commercial rules, reducible on principle to three at most, and these unconnected, ill-arranged, and in nine cases out of ten utterly useless to the person who knows them. Fractions are presented, both com-

mon and decimal, but so disguised that not the least likeness is apparent. Hence the rules must be repeated in such case, and thus in Bonnycastle's Arithmetic appear three distinct rules headed as follows:—

Rule of Three.
Rule of Three in Fractions.
Rule of Three in Decimals.

These are applied, as before, mostly to commercial affairs, which we imagine are considered as forming a necessary preliminary to geometry, since the road to the Pons Asinorum is always made to lie through Agio and Banco, Interest and Discount, and the like. The final consequence is, that the pupil having worked unmeaning and useless questions by slatesfull for some four or five years, comes out master of a few methods, provided he knows what rule a question falls under, which is not always sure to be the case: for in all probability the first application which it is necessary he should make will be a combination of more rules than one, and, therefore, not exactly to be solved by the rule in his book. And here he is fairly aground; for not having any principles, the necessity of one step different from that laid down in the rule is a total extinguisher upon the success of his efforts. So much for the system of arithmetic most appropriately called *ciphering*, since intellect goes for nothing throughout.

After the excellent preparation above described, such of the pupils as retain any power of comprehension, or have not been utterly bewildered in the labyrinths of cwts. and lbs. are made to commence geometry, or as it is called *mathematics*. Here we must observe, in justice to the instructors, that they have not degraded the latter

term by applying it to their figure-work, miscalled arithmetic. And here the form of demonstration is adopted. We may ask, how comes it that reasoning, utterly banished from arithmetic and algebra, has continued to be an essential of geometry? We suspect it arose from the fact of the treatise of Euclid being found already established, and the disinclination to overturn any institution being so great, that this work preserved its place in spite of its truth and beauty. Had it not been for this, we suspect that geometry would have consisted in calculating the area of squares and triangles—in fact, that it would have been all contained in one of our practical works on mensuration. Even as it is, there are not wanting some contrivances to prevent the perfect mastery of reason. One is, to give the pupil a case of instruments, and let him spend his time in drawing figures, taking care that these shall consist of broad ink lines, to prevent his eye and hand from acquiring the incidental advantage of real accuracy. The propositions are also said by rote, for the convenience of those who find their memory in a better state than their reason. Many a youth who can *say* the first book of Euclid cannot say whether it would or would not do equally well to reverse the order of all the propositions. Great attention is paid to the phraseology of the book. The never-ending reiteration of Simson's Euclid is the very cream of the matter. But the prime feature of the system, though now somewhat obliterated, was the necessity for recollecting the numbers of all the propositions; for it could clearly be of no advantage to know that three angles of a triangle are equal to two right angles, unless it was also known that this is the thirty-second of the first book. There seems to be

a magic in numbers, which no one can withstand, from Leibnitz, who proposed to convert the king of China to Christianity by means of the binary arithmetic, to the mathematical master of a country school, who measures his pupils' conviction of geometrical truths by their power of recollecting the order in which they come. In addition it must be observed, that the more difficult parts of the system are, like the rest, said or sung after the manner of school-boys, without the least elucidation. The fifth book, which, though defended by many on account of its superior rigour, is pretty generally admitted to be very difficult, if not absolutely unintelligible to the young, shares the same fate. If geometry is at all connected with algebra, it is by means of false analogies and such jargon as that the algebraical theorem $(a + b)^2 = a^2 + 2\,a\,b + b^2$ proves the fourth proposition of the second book, and why? because a^2 or *a multiplied by a*, is *called* the square of *a*, and *a b* the *rectangle* of *a* and *b*, &c.! Under these circumstances, the inquisitors who condemned Galileo would not much object to our geometry, seeing that such reasoning might be made as effectual in proving the stability of the earth, as the arguments of that great man were in overturning it.

We now come to the method of teaching algebra, with regard to which, all that has been already asserted in speaking of arithmetic holds to its full extent. But as the former subject holds a higher rank than the latter, it would be undignified not to teach it with some defects peculiarly its own. If arithmetic were unintelligible, algebra is made to render that obscure which before was easy. The latter may be divided into two parts: the first containing merely universal arithmetic, that

is, calculations leading to theorems which are equally true for classes of numbers. To investigate these, universal numbers are introduced, represented by letters, for which, when the process is finished, any numbers may be substituted which are consistent with the conditions of the problem. The second and more extensive branch takes its rise in a peculiarity which distinguishes algebra from all other sciences, viz., that when a problem is impossible, or admits an infinite number of solutions, or has been misunderstood in applying algebraical reasoning, the solution itself, instead of being rational and consistent, points out the error by appearing in one of the forms $-a$, $\sqrt{-a}$, $\frac{a}{0}, \frac{0}{0}$ and others which the algebraist will immediately recognise. These symbols are contradictory and absurd in their nature, yet, by carefully observing the problems in which they occur, it has been made apparent that each of them belongs to one particular species of mistake, and to no others. Hence the solution itself points out the error and the mode of correcting it, and these symbols take their place by the side of those in which no contradiction occurs, and can be used with certainty, and, by those who know their meaning, without confusion of ideas. In employing them, it is sometimes necessary to extend the signification of common terms to avoid separating analogous cases and multiplying definitions. It is plain that this refined branch of the science should not be the first taught, but that the pupil should be led, in the track of invention, to its several parts, so as to arrive at each at the precise moment when he can understand its origin and use. A contrary course will ensure years of travelling in the dark,

besides the certainty of accustoming the young mind to implicit belief in apparently contradictory propositions. But as if this were to be desired, we find the most elementary parts of algebra crowded with numbers which are to be subtracted from nothing, the results of which are to be added to and multiplied by similar numbers, for in no other sense can the pupil in that stage of his progress interpret the symbols which are put before him. This is on the supposition that he attempts to interpret them at all, about which no great concern is manifested. Thus, in Bonnycastle's Algebra (the school abridgment) we find the following definition :—

" — *Minus*, the sign of subtraction, signifies that the latter of the two quantities *between which* it is placed must be subtracted from the former." Six pages do not elapse, before we find the pupil directed to add $+ 3xy$ to $- 2x$.

It may be said, that pupils raise no objections. This is the most fatal argument that could be adduced. We know well that pupils always receive implicitly what their masters tell them, and why is it that they are led to the study of Mathematics? Precisely that they may learn to raise objections, and how to raise them in the proper place, when false logic and absurd definitions make objections desirable. To make him turn a mill is not the way to restore sight to a blind horse, nor will a routine of unintelligible or contradictory propositions develop the powers of the mind.

As in arithmetic, so in algebra, there is no reasoning, but all is rule and work. Nay, even the instructor himself is not supposed to possess this faculty, since to all the works of algebra a key is published, containing

literatim the solutions of all the questions, simple and otherwise, and it is well known that no similar work will succeed without such an accompaniment. In the key to Bonnycastle's Algebra we find $a - x$ multiplied at length by itself, for fear the instructor should slip; also the solutions of the equation $4-9x=14-11x$, and many other such.

In answer to a defence sometimes set up, that the system is *practical*, we observe that much of what is done has no reference to any practical end whatever. The great body of the algebraical work of a school consists in questions of multiplication and division which never occur in practice—above all, in the solution of certain conundrums called problems, producing equations, of the *practical* nature of which the reader shall judge from the following specimens extracted from Bonnycastle's Algebra.

"A person being asked the hour, answered that it was between five and six, and the hour and minute hands were together. What was the time?"

"A post is $\frac{1}{4}$ in the mud, $\frac{1}{3}$ in the water, and 10 feet above the water; what is its whole length?"

"A person has two horses and a saddle worth 50*l.*; now if the saddle be put on the back of the first horse it will make his value double that of the second, but if it be put on the back of the second it will make his value triple that of the first; what is the value of each horse?"

Now if all this be meant for improvement in theory, no one will deny that the reasons of all the rules should be previously understood; but if they be practical questions, we need only say that people have more pertinent methods of answering the question "What's

o'clock ?"—that no one concerns himself about the proportion in which a post is shared between wind, water, and mud; and that the Newmarket gentry have a better way of determining the value of their horses than by involving them, saddles and all, in a simple equation.

Such is a general outline of a course of elementary mathematics which was universal, and is still too general. We do not mean to charge every place of education with every one of these absurdities. It would be monstrous to suppose that, however universal the prejudice may be against reasoning, all should have adopted exactly the same method of keeping it out of the way of boys. We proceed to offer some suggestions as to the manner in which this system should be improved, in doing which, we cannot assume the tone of certainty in which we have hitherto proceeded. All that has been stated hitherto is notorious fact; we now come from matter of evidence to questions of opinion, knowing that it is more easy to pull down than set up, though feeling convinced that the following methods will be found more profitable than those which we have described.

It is useless to present reasoning in any shape until the language used is perfectly familiar. No one can learn new words and comprehend new combinations of words at the same time. Hence a perfect acquaintance with the English sentence is the first thing to be taught. In this knowledge boys are usually deficient. They know, it is true, how to name each part of speech; but they have no acquaintance with that more general part of grammar which is the foundation of the forms of logic. As an example, no mistake is more common than concluding the converse of a proposition to be the same

thing as the proposition itself in every case where the terms are new or complicated. Thus in commencing geometry the student thinks that "all equilateral triangles are equiangular," proves that all equiangular triangles are equilateral. These errors should be guarded against beforehand, by exercising the pupils in simple deductions, such as are to be found in every syllogism, taking care that all the terms used have reference to objects with which they are familiar. It should be illustrated to them that the truth of an argument depends on two distinct considerations, the truth of the premises, and the manner in which the conclusion is deduced from them. They should be made to see the difference between a fact and a deduction from two or more, and also that good reasoning may be instituted upon data which are imaginary, such as the definition of a point and a line in Euclid. It is much to be regretted that no book exists in our language which can be recommended to children as a direct exercise of thought on subjects with which they are familiar. He who shall supply this desideratum will deserve more than the present age will be willing to allow, but may safely trust his fame to succeeding generations. For want of such a previous exercise the boy has to contend with two difficulties at once, new things and new methods; and education is not what it should be, a search after that which is not known, by the light of that which is. We proceed to the study of arithmetic.

The method of numeration should be clearly explained and illustrated by reference to other systems besides the decimal. By the use of counters or any similar mechanical means, the pupil would readily perceive the use and advantage of giving to figures a local value. The

explanation of the four principal rules would then be easy, but in learning them for the first time the pupil should not be allowed to make use of the abbreviations which will afterwards be convenient for practice, and which all consist in the omission of ciphers. The arithmetic of concrete quantity would furnish abundant illustration of these rules, since the principles of all parts of the science are the same. The rule for finding the greatest common measure of two numbers will supply an example of logical argument, which should be repeated on several distinct examples. In fact, the learner should accustom himself to apply to every case those principles of reasoning which in algebra are generalized by the application of universal symbols for numbers. He will thus smooth the road to the latter science, which will present only one new feature at first. In teaching fractions, a perfectly correct notion of their meaning should be given, illustrated by examples taken from concrete quantities. Distinct things should not be confounded because they have the same names. The multiplication and division of fractions is an example. Strictly speaking, the definitions given of these words can apply only to whole numbers, or to a whole number and a fraction: the name is extended *after* that operation is discovered, which it will be necessary to substitute when fractions take the place of whole numbers in a problem, and not till then, should the student be allowed to use the terms as applied to both sorts of quantity. The transition to decimal fractions is simple and obvious; but the pupil, before he is permitted to change the notation, should be accustomed to work questions containing decimal fractions expressed in the common way of representing all fractions. The re-

duction of any fraction to a decimal will lead to the notion of what is called a circulating decimal, which is all that the pupil requires, as the rules may very safely be deferred until he understands the nature of a geometric series.

The commercial rules are simple applications of the very first principles. They may be introduced as examples of the others, and thus many long and distinct processes found in all the books will be reduced to two or three. We have not space to enter into further detail; the following remarks will close this part of the subject.

The object of the master ought to be to make his pupil understand the process before him. The latter ought therefore to be questioned on every part of his work, and encouraged to mention all the difficulties which have occurred to him. Above all, the boy ought never to be suffered to imagine that he is stupid because he does not immediately see what is put before him. Schoolmasters do not sufficiently bear in mind, that their pupils are learning to use faculties, with regard to which, were it not for instruction, all would be nearly on a level. To discourage a beginner, by making him fancy himself beneath the rest of his species, is the surest way of losing time and trouble. That inattention or negligence should meet with reproof is undeniable, but this should not come in such a form as to dishearten the well-disposed, or to give the indifferent pupil an excuse for making no progress, by laying the blame on his faculties, and saying he has no head for arithmetic.

Numerical exactness is of the utmost importance,

and will be sooner arrived at by the pupil who understands the principles than by any other. The greatest difficulty which boys find in attaining it, arises from the custom of writing all the figures on a slate, on which (since beginners in arithmetic rarely write well or evenly) the various columns of figures are mixed, and slant in every possible way. Why should not the young calculator employ the same method as is frequently used by the older one, of writing on paper ruled into small squares, one for each figure? Let this be tried, and we will answer for a much better average rate of correctness. As soon as the principle of each rule is really understood, skeleton forms might be used with advantage, by which the pupil might be required to abide.

The study of geometry should, in our opinion, not be deferred one moment later than is absolutely necessary. Many of the names here are new, and the beginner should be made very familiar with them before he encounters the difficulties of a demonstration. This might be attained by making him previously acquainted with the leading facts of the first three books of Euclid. It is easy to give ocular demonstration of them all, and this, while it fixes the terms in the memory, will excite curiosity, and give an idea of the utility of the science. Much depends on the manner in which a study is introduced, and the commencement of Euclid's Elements is not calculated to afford a favourable idea. It consists of multitudes of definitions and axioms, some of which are far from self-evident, and begins with three troublesome propositions, showing that from the greater of two lines a part may be cut off equal to the less. This may be very necessary to the received standard of geometrical

rigour, but the beginner cannot enter into this refinement. And, in fact, the order of the propositions is not necessary to correct reasoning. This consists in forming the conclusions rightly from the premises, no matter what these last may be. It would not be contrary to good logic to assume the whole of the first book of Euclid, and from it to prove the second; provided that afterwards the first book were proved, without the necessity of taking for granted any proposition in the second. The argument, or collection of arguments, would then stand thus:—

If the first book be true, the second is true.

But the first book is true;

Therefore the second is true.

The order in which the premises come does not affect the soundness of the conclusion, and provided the pupil understands that the conclusion depends equally on the premises and the reasoning grounded upon them, which are two distinct things, an error in one not necessarily affecting the other, he is perfectly safe, and takes a view of the process of reasoning not generally given to the young. We should then recommend the following principles in teaching geometry:—

Never to state a definition without giving ocular demonstration of one or more facts connected with the term employed.

To defer every axiom, until that point is arrived at, where it becomes necessary.

To impress upon the mind of the pupil that the reasoning is not affected by the assumption of an axiom to be proved afterwards, provided the proof of it is independent of the proposition which it was used in proving, and its consequences.

To accustom the beginner to retrace his steps, and going backwards from any proposition, to continue the chain, until he arrives at the point which he set out by assuming.

To supply a proof that "all right angles are equal," and to deduce the axiom on which Euclid grounds the theory of parallels, from this more simple and obvious one, viz., "through a given point not more than one parallel can be drawn to a given straight line."

To omit those propositions which are not subsequently useful, among which may be reckoned many in the second book, and all in the fourth.

In order to accustom the pupil to correct statement of propositions, he should be made to write all that he reads. But here is a probability that he will trust entirely to the book. This may be prevented by requiring him to use numerals instead of letters throughout, and to arrange the whole in the following manner. Let a sheet of paper have two vertical columns, ruled on the left, and let the whole enunciation, construction, and demonstration of the problem be divided into distinct paragraphs, each containing only one assertion. Number these paragraphs in the first ruled column, and, in the second, opposite to each paragraph, enter the numbers of the preceding ones from which it follows. Where a previous proposition, or an axiom is required, write its enunciation at the end, with a letter before it, and enter that letter opposite to the paragraph in which it is assumed. If the pupil does this correctly, the instructor may be well assured that he understands the proposition.

In the application of algebraical symbols to geometry, misconceptions usually prevail which are coun-

tenanced by the looseness of expression of many elementary works. They are mostly founded upon the analogy existing between the algebraical expression $a \times a$, or a^2, called a square, and the geometrical square described upon the line which contains a units. Against this confusion of terms the teacher must be on his guard, and should carefully avoid that symbolical notation recommended in some books, by which $A\,B^2$ is made to stand for the square described on $A\,B$. If a short symbol for this be used it might be $\boxed{AB}$, and the necessity of proving that the number of $\boxed{1}$ is contained in $\boxed{a}$ is $a \times a$, would not be concealed under a *petitio principii*.

With regard to the fifth book of the Elements, we recommend the teacher to substitute for it the common arithmetical notions of proportion. Admitting that this is not so exact as the method of Euclid, still, a less rigorous but intelligible process is better than a perfect method which cannot be understood by the great majority of learners. The sixth book would thus become perfectly intelligible.

It would much benefit the pupil if solid geometry were introduced at a more early period. There is nothing in the elementary propositions which requires more than the first book of Euclid ; and by a judicious use of the *real* figures, instead of perspective drawings, the subject might be amazingly simplified.

We come now to the subject of algebra, regretting that the limits of this article will not permit us to discuss the subject upon the scale which it deserves. The great drawback to the proper attainment of this science is the miserable previous instruction in arithmetic. When

this defect is remedied, and not till then, can we expect any better results. It is the practice not to let the pupil proceed to the principles of equations until he can work questions in all the previous rules of a nature which very rarely occur in practice. And of these rules themselves it must be observed that, in order to preserve analogies with arithmetic, their meaning is usually distorted. To the unintelligible way in which the negative sign is used we have already alluded. We shall now explain our views as to the manner of proceeding.

The new symbols of algebra should not be all explained to the student at once. He should be led from the full to the abridged notation in the same manner as those were who first adopted the latter. For example, at this period he should use aa, aaa, &c., and not a^2, a^3, and should continue to do this until there is no fear of that confusion of $2a$ and a^2, $3a$ and a^3, &c., which perpetually occurs. Whenever any new symbol is introduced, not a step should be made until it has been rendered familiar by finding its arithmetical value in particular cases. This indeed is the first exercise; algebraical expressions increasing in complexity are given, and also certain values for the letters, and the student is left to find the corresponding arithmetical value of the expression. Whenever a negative result occurs it should be thrown aside as an impossibility, the pupil being told at the same time that use will be afterwards made of such expressions when he can understand what they mean in the solution of a problem. The leading principles of the solution of equations of the first degree might then be easily established, and applied to some numerical equations. The four rules should follow,

the principles being previously explained, and all negative results avoided. The student is then in possession of the means of solving an equation of the first degree in which some of the given quantities are literal, and may be supplied with examples a little more likely to aid his future studies than the conundrums about posts and saddles which we have instanced.

At this stage of his progress the pupil should be set to work a problem in which a negative result occurs. It should then be pointed out to him that there is a misconception of the problem itself, and the manner of rectifying that error will show, in the course of several examples, what is the meaning of the negative answer. At the same time it will be easy to explain by examples the nature of the wrong suppositions which lead to results of the form $\frac{a}{0}$ and $\frac{0}{0}$. He should then examine for himself what change is produced in a process which sets out with some assumption as to $b - a$, when this has been incorrectly written for $a - b$. By comparing the true and false processes he will deduce the rules according to which negative quantities must be treated, in order that their introduction may not affect the soundness of the conclusion. He is thus placed in the same condition as to results with the pupil who has pursued the common method; with this difference however, that he can explain conclusions which the other cannot, and has never believed that, $a - b$ meaning a diminished by b, there can be such a thing as $-a$, or a quantity *less than nothing*.

The view which is generally taken of expressions of the first and second degree is too confined for the future purposes of the mathematical student. It is this: what

values of x will make the expressions $a\,x - b$, $a\,x^2 - b\,x + c$, &c., equal to nothing: whereas, it is necessary to inquire what values of x make these expressions positive, negative, or nothing. All that is learnt appears to have no higher view than enabling the student to solve the pretty problems which we have mentioned, and not to simplify the higher parts of the science. This is too much the fault of the education of our schools in general. It is not recollected that they cannot expect to make learned men; but they may make good learners, and at the same time produce such a desire for knowledge as shall lead the individual to devote himself to study, where it is not matter of compulsion, as in the Universities, and still more amid the occupations of life. The great mistake lies in a notion that they are to teach the greatest possible number of bare facts before the pupil arrives at the age of sixteen; whether he will leave school with the desire of adding one more bit of knowledge to his stock, or with the power to do so if he has the will, does not seem to be considered of any importance. Again we call upon all who still adhere to the old system to reflect a little on their own interest. The number of new methods of teaching proposed every day shows the existence of a general feeling that some change is requisite. The Universities, which have made great advances within the last twenty years, may be proposed to the schools as an example for their imitation. And let them recollect, that, the demand existing, the question is not whether they will supply what is asked for or something else, but whether the public must come to them or go elsewhere.

ON THE STUDY OF GEOGRAPHY.

By G. LONG.

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A COMMERCIAL country, with numerous and extensive foreign possessions,—a country whose soldiers and ships are found on almost every coast, and whose travellers visit every country, would seem peculiarly adapted to be the centre of geographical knowledge. That Great Britain has made, and is daily making, very large additions to our knowledge of the earth's surface, is a fact which will be generally admitted; and that hitherto all these accumulated facts have been turned to very little account in systematizing our knowledge, is another fact which is equally indisputable. The nation that has now for several centuries made discovery, colonization, and foreign conquest, whenever opportunity offered, part of its political system, had not, three years ago, even a geographical society, and at present there is not, we believe, a single public teacher of geography in the universities and colleges of Great Britain, with the exception of the professor lately appointed in the London University *. The London Geographical Society now forms a point of union for those who are interested in the knowledge of the earth's surface, and by its Journal it invites and offers facilities to the publication of many valuable contributions, which otherwise would never appear. The formation of a library and a collection of maps, which also are part of the Society's plan, together with the

* Geography has been publicly taught at the London Mechanics' Institute for some time.

communications existing between this and foreign societies, will tend to concentrate a great variety of information which hitherto has been scattered and comparatively useless. The limited funds of the Society, and the great expense and risk of expeditions, place all direct discovery almost beyond the sphere of the Society's operations. And indeed, as a general rule, such discovery is best left to individual enterprise, or it belongs to the business of government. Yet a geographical society ought to contribute indirectly towards discovery by pointing out to travellers what has been already done, by furnishing them with a set of proper and well-arranged questions and directions, and by giving such countenance as each individual or undertaking may merit. The holding out a promise of a prize for a certain thing to be done, or for the writing of a certain essay, for which individuals must be competitors, as the phrase goes, appears to us not likely to do any good; and we are glad to see that hitherto the Society has not had the opportunity of awarding any premiums of this kind. They have been given, as we hope they ever will be, to individuals who had done some service, without troubling themselves about the Society's offers. The Society, when it has a premium to dispose of, should look around and confer it on some individual whose services are such as will render the conferring and the accepting of the premium equally creditable to both parties. The Geographical Society's views cannot, we think, go beyond what we have mentioned; nor do we see any way in which such a Society is likely to improve geography as a science. Some persons, however, differ from us in opinion on this last point, and think that the Geographical Society may in many ways tend to raise geography to the rank of a science. This opinion appears to us to be founded on a misconception of the na-

ture of a society; and in conformity with this, as we conceive, erroneous notion, societies are often blamed for not doing that for which they are by their constitution altogether unsuited.

It is only by making geography an efficient part of early instruction that we can expect to see a set of men formed, who, being thoroughly acquainted with the proper objects and limits of their inquiries, will set about classifying the innumerable facts with which geography has to deal, and deducing from them legitimate inferences. Of course, it will be said that geography is already a part of instruction in every school: this is true, and yet it is still far from having assumed any shape that entitles it to the name of a science. The term science has been generally applied, and sometimes exclusively, to those branches of investigation which have quantity for their subject, and which proceed on strict demonstration. Thus it is applied to the pure mathematics, and, by an extension of the definition just given, to those branches of knowledge whose principles are founded on observation and experiment, and whose results are expressed by number. It may also be applied, and should be applied to all subjects, in which such general principles have been deduced as render it practicable to arrange all the matter of a subject under certain heads or divisions, such heads or divisions being formed and distributed in accordance with, and subordinate to, certain general principles. Geography is a subject which, from its nature, has been hitherto particularly vague and indefinite. It is not a science of demonstration; nor is it a thing of which the matter is divided and distributed in subordination to general principles; nor, like zoology and botany, is it limited with precision by the nature of the subject of inquiry: it treats of all things, or is said to treat of all

things, and this is the reason why it treats with precision of nothing at all.

Geography, as the school-books tell us, is the description of the earth, and then they refer us to its Greek etymology as confirming the definition. On looking into these books, we find that they are in general any thing but a description of the earth; and yet a description of the earth's surface *is* the proper and legitimate subject of geography. We altogether object to the views of those who advise us to keep the definition of geography somewhat vague, in order to comprehend within it as much useful matter as we can. In a good book of travels we are glad to find every kind of information, and from such a work the botanist, the zoologist, and others, may glean those facts which bear more particularly on their several pursuits. But when we are endeavouring to improve a science, or to convert a vague subject into one, the first thing that we have to do is to fix its limits.

Geography will never deserve the name of a science till the matter of it is divided and arranged in conformity with general principles; nor of knowledge, till its facts are reduced as much as possible to numerical representation; and it is no objection to this, that many of its numerical representations must be merely approximative. It is better to know that the average value of a fact lies between 95 and 100 than to have no definite idea of it at all.

Geography takes for granted the spherical figure of the earth, but the astronomical determination of positions upon its surface is one of its special objects. By the determination of a great number of coast positions, we arrive at a notion of the exterior configuration of the land, as bounded by water. The investigation of the tides, currents, &c., of seas and oceans, is a subject extensive enough of itself, and properly belongs to the

hydrographer. To this separation of hydrography and geography some objection has been made, but not yet supported, as far as we have seen, by any good reasons. The study of rivers is generally admitted to be an important part of geography: why then, it is asked, not include hydrography, as above explained, in the science? It is a sufficient answer to a *mere* objection put in the way of question, to reply by asking another question: the proper answer to this objection then will be—why should we include it? The division of the globe's surface into land and water seems a very natural one, and the knowledge of this surface will, in our opinion, be best forwarded by following the obvious division which nature presents to us. We assign the rivers to the geographer, because the hydrographer cannot trouble himself about them any further than concerns their outlets and tide water. It is in such places as these, and at the heads of bays and inlets, that the hydrographer and geographer will sometimes meet and have a little friendly communication; but neither of them, if they are wise, will seek to enlarge his domain by encroaching on that of his neighbour.

The next object of the geographer, and, in fact, his great business, is to determine the form of the surface of the land. If we knew the latitude and longitude of each place, and its perpendicular elevation above any given level, we should know all the irregularities of the earth's surface, which, however trifling they may be when compared with the whole mass, are of the highest interest to man, as without them the earth would not be suited for his habitation. The ascertaining of the actual and relative heights of places on the earth, which may be termed *hypsometry* (height-measurement), is a branch of geography that requires both to be extended and rendered more exact. But the number of points that we

can ever expect to ascertain will always form a small part of the whole surface of a country, and we must therefore have recourse, by way of supplement, to *geographical description*. This branch is necessarily less exact than the former, inasmuch as it must avail itself nearly altogether of *words*, which never convey with perfect accuracy either the facts of nature or the impressions of a writer. It necessarily involves the use of a great many terms, such as mountain, valley, plain, which, from their nature, can never be defined with such accuracy as to render the use of them altogether free from objection. Still we must attempt, partly by numerical values, whenever this is practicable, and partly by description and by representation on paper, to give as accurate an idea as we can of the mountains, valleys, plains, and all the irregularities which mark the surface of a country. Here the pursuits of the geographer and the geologist have certain points of contact. The geologist, though his inquiries are more particularly directed to the position of rocks and the nature of their contents, cannot overlook the general configuration of the surface. Nor will the geographer, though his special object is to ascertain the *form* of the surface, neglect to observe such changes as are evidently in progress and are altering the character of that which it is his object to estimate. The general description of mountain-systems, including the direction of the main masses, and the area occupied by them, the junctions of different groups, the elevations of the chief points, the determination of the drainage-boundaries, &c., is now classed under the title of Orography. This term excludes, or it ought to exclude, all that refers to the particular mineral composition of mountains: it treats specially of their *form*. But in doing this, in describing scarped sides, flat tops,

needle peaks, or broad round backs, we conceive it is the business of the geographer to state, in *general* terms, the nature of materials which have such definite and characteristic forms.

The next important branch of geography is the description of the sources, course, and volume of rivers; the description of fresh-water lakes is included in this head. This branch leads to a more minute examination of those boundaries which determine the course of the waters that rise from the earth in springs, and of those which, descending in rain, find a more immediate channel by which to pass off. The drainage of a country is, as a general rule, marked out into a number of great divisions, often called, whether with propriety or not, *basins*;* each basin has its main drain, with a number of smaller drains running into it. To determine the limits of each great basin, or the boundary lines of the surface drained by the great rivers of a country, is a necessary step towards an accurate knowledge of it.

The study of rivers leads to a more careful consideration of the slopes along which their waters descend towards the general recipient, which is either the ocean, an inland sea, or lake. These slopes are generally bounded by high land on each side, constituting, with the lowest level between them, what are called valleys. The form of these valleys, through which we trace rivers, is almost infinitely diversified, and the study of them may be said to be the most interesting and useful part of geography; they are the chief seats of man's abode, and of his culti-

* It might perhaps be advisable to use another term, as the term basin is used by geologists, and in a different sense. Basin however is well established in geographical description, as indicating the whole space drained by a river: "valleys" of course are included within "basins," and are parts of them. (See Darby's United States, p. 59, note.)

vation, and their waters give life and activity to his social intercourse. Various names have been already given to valleys, according to their form, and in countries where the features of nature are on a large scale, some of these names are appropriate and convey an accurate idea. When a river runs in a long valley, bounded by parallel ranges of high land, of which we have numerous striking instances, its course lies in a *longitudinal* valley. But the course of a river is often changed, and it runs from a valley of the kind just described either into another valley or a completely different kind of country; this passage is generally effected by its waters taking a direction which makes a considerable angle with the line of the mountains and passes through them, either by a circuitous winding course forming a succession of *transverse* valleys, or by one short and narrow passage, to which the name valley cannot be given; the name of gorge has been sometimes used to express a passage of this kind *. But a more accurate examination of valleys will show the propriety of some additional terms; for as valleys have evidently been produced in more ways than one, so their forms are too various to be included in two or three terms. Some rivers do not run in valleys, according to any definition of the term valley as it now exists. Many rivers which flow through a flat region have probably grooved out a channel in the earth, to allow a free passage for their waters. The depth and breadth of these grooves are evidently dependent on the volume of water and the nature of the ground, and, we believe, are deepest in all countries where the occasional floods are the greatest. A river may thus hollow out a

* See Strabo's description of the Gorge of the Pyramus (p. 536. Casaub.); and the Passage of the Potomac through the Blue Ridge, in Jefferson's description.

channel several hundred feet deep, as the Ohio river, in some parts, has done, till it has made a passage large enough to hold any body of water that may come down. These excavations look like valleys, and are called so, but they seem to us to require a different name from other valleys. The hills which bound some parts of the Ohio and other rivers of the Mississippi valley have been sometimes appropriately called River-hills: seen from the water they present slopes, and sometimes tolerably steep sides; but their tops are the level of the plain, and have been cut into hill shape by the lateral streams which fall into the main channel *. This theory of the formation of the bed of the Ohio may be true or not: we give it here as it is given by the authorities referred to; and we do this merely with the view of drawing attention to the actual form of the river's bed. As to the hypothesis itself, of the channel of this or other rivers having been formed solely by the action of water, we may remark, that it is not to be overthrown, as some would wish to overthrow it, by a few loose comparisons with other rivers which are of a different character. Those who will take the pains to begin to study the surface of the United States, will find they have yet much to learn; for considered as a whole, the country presents in its physical character and its climate many features which, if not peculiar to it, are certainly not seen in all parts of the world. Those who wish to look further into this subject, may consult Darby's valuable work (p. 298, &c.) on the United States, without the study of which, or an actual knowledge of the country, any remarks upon the geography of the United States can have but little value.

* See the quotation in James Stuart's America, ii. 402, &c., Major Long's Expedition to the Rocky Mountains, i. p. 38, &c., and Darby's View of the U. S.

It would be desirable to have terms which should accurately express the several great divisions of geography, though we fear none can be proposed which will be universally received. There cannot, however, be much difference of opinion as to the propriety of admitting the following divisions of the subject, we say nothing of the names, which naturally arise out of the considerations already stated.

I. *Topothesy;* the determination of the latitude and longitude of points on the earth's surface *.

II. *Actography;* the *special description* of the form and nature of coasts. The outline of them is determined by No. I.

III. *Hypsometry;* the determination of the elevation of the earth's surface in general. It treats both of the elevation of level surfaces, and the depression and elevation of irregular surfaces.

IV. *Orography;* the description of mountains, is a branch of No. III.

V. *Potamography;* the description of rivers and fresh-water lakes.

It has been suggested that other divisions should be made, to render the determination of the form of the earth's surface complete. What data a man can ask for beyond I. and III., we are unable to conjecture.

To these five heads we think it advisable to add—

VI. *Climatography;* the description of climate. It depends mainly on I. and III., modified by numerous local circumstances. 'Climatology† is geographical me-

* Τοποθεσία is used by Cicero ad Attic. I. 13, as synonymous with τοπογραφία. But the word properly means what in the text is intended by it.

† We prefer the compound climatography for reasons sufficiently obvious. For the same reason we distinguish between anthropology and anthropography.

teorology, or the study of the properties of the atmosphere in the various parts of the globe: it is consequently a part of physical geography.' (Schouw, Beiträge zur vergleichenden Klimatologie, 1827.) The business of *observing* temperature, winds, rain, magnetic phænomena, &c., are distinct pursuits, and this branch of knowledge is only to be improved by long continued and often by simultaneous observations made in many places. But it appears to us to be the business of the geographer to collect and compare the results of such observation made at various points on the earth's surface, and to endeavour to deduce from them general laws. If the geographer, who has continually to do with astronomical position and elevation, does not attend to this branch, we do not see whose business it is. A geographer may be an observer, or not, of the astronomical phænomena which determine position; he may measure the heights of mountains, or he may learn these isolated facts from others: but it is his special business to collect all facts bearing on his science, to subject them to the tests of comparison with other known facts, and to determine their relative value before classifying them or drawing general conclusions from them. We think the critical part of geography is hardly enough insisted on. Till facts are in some way so marked as to show their relative value, we do not see how geography can become more exact. As the leaving of large blanks in maps indicates our ignorance, and is a better plan than putting in rivers and mountains of which we know nothing; so in the geographical description of countries, it should be stated, of what parts we know little, of what parts we know nothing; and the points about which knowledge is wanting should be particularly enumerated.

Beyond the six heads above enumerated, the geographer, in our opinion, should not go; and we think they will furnish him with ample employment. It is not the business of the geographer to look under the surface of the earth; he leaves that to the geologist. Nor is it his business to treat of the distribution of animal and vegetable life over the globe: this, we think, belongs to the botanist and zoologist, and though it is a branch in which writers on botany and zoology are not always very exact, it is desirable that they should labour to improve a subject which belongs to no other branch of knowledge so closely as theirs. On this point, however, there is much difference of opinion. Some think that the distribution of plants and animals is an important part of geography; and indeed, if any geographer will undertake to treat this department satisfactorily without neglecting the rest, he will do good service. But we apprehend that it will be found very difficult for any one man, in the present state of our knowledge, to treat all of them as completely as could be wished. It is from a conviction of the necessity of limiting the objects of geographical study, that we venture to suggest the omission of this branch.

There is one animal whose geographical distribution is a subject of great interest—the animal Man; and it has often been remarked, that countries are generally interesting in proportion as they are connected with his history; but particularly with the history of *civilized* man: the history of the man whom the races calling themselves civilized stamp with the name of barbarian and savage, is not generally considered to possess much interest. This is true to a certain extent; we all feel that those parts of the world which have been the scene of

great historical events recommend themselves much more strongly to the imagination than newly-discovered countries inhabited by men usually termed savages. But with the increase of our knowledge, the means that open on us for mental gratification increase also. The inquirer into nature finds something new in every portion of the world, however wild and desolate; and even the barbarous inhabitants of our globe furnish us with abundant materials of curious inquiry. We contemplate man as the highest in the series of animals, zoologically considered, and when viewed with reference to his situation on the earth, his physical characteristics, his habits, and his language, as furnishing an unbounded field for inquiry and speculation. This branch of inquiry has not yet assumed among us, in ordinary acceptation, the distinctness of a separate subject, which is one reason why the numerous facts already known are very imperfectly arranged, and why curiosity is less actively directed towards the accumulation of new ones. This branch of knowledge has hitherto been generally left to geographical description; but it is evident that it can only acquire any systematic shape and value by being made a distinct subject of inquiry.

The term Anthropology, which is familiarly used in Germany, has for its proper subject man considered as an intellectual and moral being. It would be taking only a part of the subject of anthropology, and giving an undue extension to this part, if we were to make it include what we propose to denominate Anthropography*. Anthropography should treat of the varieties of the human race, as at present existing, and as determined

* See Immanuel Kant's Anthropologie in Pragmatischer Hinsicht, p. 303, &c.

by those physiological characters in which the best judges agree; it should mark out the countries in which they now dwell, the migrations of undoubted authenticity which have taken place among them, and the consequent mixtures of races: it should also attempt a classification of languages, marking such common points as are observable in two or more languages, when the proof of original identity is imperfect: it should not confound under one race or class, different races which, owing to various causes, have now a common language: it should describe those domestic habits, such as marriage, &c., and those religious ceremonies, which are most indicative of national character. It is almost superfluous to remark, that an infinite variety of facts, not easily reducible to any general head, would be collected in a system of Anthropography—all tending to make us better acquainted with the various capabilities and the strangely-diversified character of the animal man.

The study of the division of the world into political communities, the description of political boundaries, of cities, towns, roads, canals, commerce, &c., which forms the main subject of our ordinary books of geography, should in our opinion be taught under the head of Statistics. It seems to us that, to transfer all the mass of knowledge of this description, a great part of which is capable of a tabular form, to the province of Statistics, should not be looked upon as an innovation merely to help system-making: every subject gains in precision and utility, when we find it occupying the place and embracing the matter which are clearly its due. The term Political Geography has been generally used to comprehend the kind of description and the collection of facts just alluded to, and to distinguish them

from the real subject of geography, termed Physical or Natural, in opposition to Political. We are not advocating the exclusion of Political Geography from *books* which profess to describe a country. When we read of a country, we wish to know of its towns, public buildings, institutions, and roads, as much as we do of its mountains and rivers, and often much more. Still we think that *treatises* on geography would be improved by making the physical character of each country a distinct and prominent part of the subject. Political Geography is a distinct, though necessarily a connected subject; and its facts should be reduced as much as possible to a tabular form. Indeed a large part of physical facts also may be classed in tables, as they become known, for instance, extent of sea-coast, heights of mountains, lengths of rivers, &c.; and we should prefer, instead of giving numbers as certain when they are only approximations, to have a double column, each containing a value between which we might be sure that the true value would be found. This would perhaps destroy a great deal of what is termed knowledge, by substituting for it doubt and uncertainty; but in the end knowledge would gain; it would be less in amount, but of better quality.

The question, we think, may fairly be raised, whether, in *teaching* geography, we ought to comprehend all the subjects already mentioned as comprised in physical and political geography, or whether we ought to strike out some of them from the list. This question cannot be answered without considering the age and acquirements of the persons who are to receive instruction. If they possess the proper elementary notions, and the necessary preliminary knowledge, there seems no reason why the teacher should not follow his own views of what will be most serviceable to the class in

the actual state of their knowledge; he may touch lightly on some parts, dwell more on others, and endeavour to direct the studies of his hearers by suitable remarks and references, rather than by minutely working out any one branch. We can imagine that there may be many very good courses which shall differ materially as to arrangement, and the proportion allowed to each division. But we do not think that in any course of teaching, or in any elementary treatise, *geography* properly so called, that is, physical geography, should be mixed up with political geography, or *statistics*. By keeping the two subjects quite distinct, by exercising a careful criticism on all facts presented as facts, and by arranging them respectively in their proper classes, we shall begin to reduce to the form of knowledge two of the most interesting branches of human inquiry. One will teach us what the surface of the globe is, and what nature has done for each portion to fit it for the use of man: the other will show what man is doing for himself; and by the brief symbols of number, well ascertained, well digested, and then rightly interpreted, we shall learn how man lives,—we shall know his pains and his pleasures, his knowledge and his ignorance, his virtues and his vices, his progress or his retrograde movements, his coming into the world, his going out of it, and the period of duration assigned to him, when his life is considered as a fraction of one large integer. In this country, unfortunately, it will be long before statistics can assume the form from which all these useful inferences can be drawn.

The teaching of the *elementary* part of geography is the most important. By a few years of judicious training, boys will be fitted to receive and to profit by the courses of a public lecturer, while at present we fear

most youths are so devoid of all exact elementary notions as to be unable, as a general rule, to profit much by a complete written course of lectures. It is therefore most necessary that the improvement should begin with schools. The remarks that we are going to make have reference only to instruction in geography for youths, and they suppose that all the necessary previous knowledge has been obtained. The method used at Bruce Castle (Journal of Education, No. XI. p. 115, &c.), of giving the elementary notions of geographical position by making the youth familiar with the relative position of places near him, and the mode of teaching him the use of a map, appear as judicious as any that could be chosen. When these preliminary notions are obtained, it seems doubtful what is the next best step: whether to demonstrate the spherical figure of the earth, in such ways as are suitable to youthful capacity, and then to apply Agren's method for the purpose of giving a general notion of the exterior configuration of the land; or to take the country in which the youth lives, and for the present dropping all notions of astronomical position, confine him to the determination of all points and places by the measurement of straight lines from a fixed point. If the latter mode is preferred, to which we incline, London, of course, would be used by us for obvious reasons. By measuring the distances of all the great salient points on the coast from London, and laying them down according to their true bearings, the student would get a pretty accurate notion of the form of the island, and would become familiarized with the mode of referring the position of one place to that of another by its bearings. It would be desirable that he should obtain by actual measurement on a tolerably accurate map the length of sea-coast; first by making the island into a

polygon by lines drawn from one salient coast point to another, and then by measuring it along its sinuosities. The greatest and least dimensions of the island should also be measured both on meridians, on parallels, and also between other points on the coast not under the same meridian or parallel. Methods of approximating in a rough way to the area in square miles should also be pointed out. It might then be observed how many miles of coast there are for each square mile of area, and the fraction expressing this ratio would be useful as a standard of comparison for similar fractions deduced from the ratio of the coast line and area of other islands. The value of the fraction would at once show the general nature of the coast line of any island or insular mass of land, whether it was regular or irregular *.

In describing the coast as well as the mountains and rivers of the country, a number of terms come immediately into use, such as gulf, bay, sound, channel, promontory, æstuary, river, velocity of stream, plain, plateau, marsh, mountain, mountain-range, &c.

And here, as it appears to us, is an opening of considerable difficulty. Many of these terms are vague in their meaning, and have a different value when applied to different countries. The name of gulf is not applied to any parts of our English coast, though there are indentations to which it would be applicable. We believe a notion of considerable magnitude is generally attached to the term gulf, though there are exceptions to this; but we are not aware that the term includes any notion of form. As specimens of gulfs, there are the Gulf of Venice, Gulf of Lepanto, Gulf of Lions, Gulf of Mexico, Gulf of St. Lawrence, Gulf of Guinea, &c. It

* See Berghaus, Erste Elemente der Erdebeschreibung, p. 124, & c. Berlin, 1830.

seems difficult to say what a gulf is, though it is certainly desirable to fix the meaning of such a term. Of bays we have various specimens in these islands, from Pegwell Bay, a shallow sandy flat on the coast of Kent, to Bantry Bay in Ireland. Of foreign bays, we find the Bay of Biscay, Chesapeake Bay, the Bay of Bengal, &c., from which it appears difficult to say what are those characters which enable us to distinguish a bay from a gulf. It may be said that this is all trifling, and that such objections are mere quibbles, and that we all know what is meant by the words when applied to a particular gulf or bay. But any such answer as this appears to us entirely insufficient. We do not expect that people will forthwith call the Gulf of Mexico and Pegwell Bay by their new and more appropriate terms as soon as they are announced to the world; but if there be any marked characters of form, magnitude, position, &c., which will enable us to classify the gulfs, bays, &c., under certain heads, so that when we hear of a new gulf or bay, we have at least one correct idea suggested by the word, something would be gained. If this cannot be done, so much the worse for geography, which must always remain, as many wish it to do, rather loose and indefinite.

There is some difficulty about promontories, capes, heads, headlands, points, noses, though we think this difficulty is not insuperable. The word promontory might be used in a limited sense to express the bluff projecting termination of a mountain in the sea; but there is no reason why it should be restricted to such a piece of land terminating in the sea. It is capable of being applied equally well, and sometimes is applied, to similar abrupt terminations of mountains on the edges of plains.

Cape and head are merely the same name in two different languages; but we are not at all sure that they are used with much precision. The word cape is certainly applied both to low and high land projecting into the ocean; but it is clearly desirable to have distinct names for these different kinds of projections. Nose, naze, or ness, is not uncommon in England; but frequent in Scotland, and we find it also in Denmark: we have in England Sheerness, Dungeness, the Naze, &c. All these terms perhaps would come under some of the more general denominations of promontory, or capes, if they were well defined. It would not appear very difficult to divide the different projections of land into the sea into classes, according to some one, two, or more characteristics; it might be desirable to retain the usual names of cape, &c., adding to them a distinctive term by which each would be referred to its proper class.

As to mountains, the difficulty is great, for nothing is so indefinite as the word mountain. Elevations which are only hills in one country are mountains in another; and even in the same country the point at which a hill becomes a mountain is always a little uncertain. The remedy for this is to have geographically only *one* name to indicate all elevation; the altitude of each would be one element by which its more specific character would be determined. Next to elevation, the *shape* of mountains or of high land requires consideration. Land may be elevated and yet flat; there may be an ascent to it on one side, which looks like the slope of a hill or a mountain; but on ascending to the top of the slope we may find an extensive level, declining so imperceptibly as to convey no other idea than that of a great plain. Or a mountain may have two opposite

slopes of different inclination, with what is called its summit consisting of a level plain. Such a level is found on one of the summits of Olympus in Asia Minor, and indeed they exist in all hilly countries. Hence in connexion with elevations of the earth's surface we have various kinds of plains: we have *river-plains*, *hill-plains*, *mountain-plains* (ὀροπέδια, Strabo), and, no doubt, other kinds of plains. We by no means despair of seeing names given to these different kinds of flat lands, which will be favourably received and adopted. The term *plateau*, or table-land, seems to be sometimes used as indicating high flat lands as distinct from lower flat lands; but even if it obtains currency in this sense, it is by no means sufficient*.

We have before spoken of valleys. A valley, we find, is often defined very loosely "as the low ground between mountains, and as generally traversed by a river." From this definition it must follow that a great many rivers flow in valleys for only a small part of their course, and some certainly flow in no valleys at all. It might however possibly be useful to consider all streams as flowing in valleys, provided we assign to these valleys specific names, derived from some one or more properties by which they are characterized.

There seems to be no method of imprinting on the memory a tolerably correct outline of the great boundaries of the land and water on the globe, except by some method similar to that of Professor Agren. (See Journal of Education, No. XI. p. 27, &c.) And we think there can be no difference of opinion at all on the necessity of teaching boys, or rather, according to Agren's

* See Berghaus, p. 41, &c., on flat lands, &c. His division appears founded too much on bare elevation, which we think insufficient.

plan, inducing them to teach themselves under what parallels and meridians all the great limiting points of the land are placed. For instance, a boy should be able to refer from memory such points as the Cape of Good Hope, Cape Verde, Cape Guardafui, the Straits of Gibraltar, the most southern point of Spain, the most southern point of the Morea (not the most southern point of Europe, as is sometimes stated), the mouth of the Rhine, Danube, &c., to their right astronomical position on the earth's surface. Such a bare outline as this, if a boy learned nothing at all beyond it, would save him from much confusion and numberless ridiculous errors. But this frame-work, when gradually filled up, would present to the mind a number of subdivisions, to each of which the pupil would readily refer all isolated facts, as they occur in his various readings, or whenever they are presented to him with sufficiently accurate data; he thus would acquire a real geographical picture of the earth, the great outlines of which might be continually approximating more and more to accuracy without deranging the general impression. In a similar way he would print on his memory and imagination the general direction of the great mountain ranges, and the exact position of their more remarkable points. Both for those who make geography their special study, and for the botanist, zoologist, and geologist, such a foundation of geographical knowledge is absolutely indispensable. In all the three last departments of knowledge here alluded to, can we doubt that many erroneous generalizations, and often inconsistent assertions, would be checked if a man always had this fundamental knowledge of geography?* Men cannot always write with

* One instance is as good as a hundred. A modern writer on

maps before them, nor are men always willing to be making constant references to such very troublesome monitors as good maps are; sometimes most unkindly overturning a whole heap of hypotheses, ingenious conjectures, and pleasant, easy, self-satisfying generalizations.

To acquire an accurate and at the same time a complete geographical picture of a country, we must see it represented under various forms; we must have in fact a *series* of maps with the same outline, but a different filling in. Our own island, for example, might be represented, first with a bare coast outline and the courses of the rivers. This should be studied after the method of Agren till the picture is distinctly impressed on the mind. In a second map we would place the high ground and the rivers also. Other maps might be constructed to show the artificial water system of canals, in connexion with the natural water system of rivers. A map of roads, with all the great towns indicated, and all the seats of manufacturing industry, would also be necessary; and other maps no doubt might be suggested. Such maps roughly executed would soon be produced at a very moderate charge, if a sufficient demand for them could be calculated on.

It is impossible, in our opinion, to urge too strongly the importance of an exact knowledge of *position* on the earth's surface. This knowledge is not only the true basis of all geographical knowledge, but it is an indis-

geology says—that the Pyrenees, the Apennines, the mountains of Dalmatia, and Croatia, the Carpathians, and the Alleghanies of America, are all parallel to an arc of a great circle, which passes through Natchez and the mouth of the Persian Gulf; of course they are also all parallel to one another. Such an assertion can hardly be surpassed for absurdity.

pensable element in every science which has for its object the observation and the *comparison* of natural phenomena in different parts of the earth. Without this knowledge the geographer has laid no foundation for his further pursuits, and the inquirer into nature will often fall into error, which may sometimes seriously affect his conclusions.

Next to the teaching of the general outline of countries, with their mountains and rivers, the most important thing is *climate*, or the comparison of meteorological phenomena as ascertained at different points of the earth's surface. This should, of course, be preceded by exact notions of the phenomena of the seasons, the length of day and night at different points on the earth's surface, the modes of determining the four cardinal points at any place, with the determination of the sun's angular distance at rising and setting from the east and west points at any season of the year, &c., the mode of measuring the shortest distance between any two points given in position on the earth's surface, reducing magnetic to true bearings, &c. Without this preliminary knowledge we do not see how the subject of climate can be treated satisfactorily, even in an elementary way. It would also furnish opportunities for giving a student a variety of easy problems, to the solution of which he might apply his mathematical acquirements.

We have already excluded the geographical distribution of plants and animals from the province of the geographer, with an earnest request to botanists and zoologists to look carefully after them, for nobody else can do it so well. But it does not follow that, in teaching the great principles of geography, these considera-

tions should be entirely excluded. Plants and animals are, to a certain extent, the indications of climate; and it is a matter of curiosity and of great interest to compare different points of the earth's surface, similar in position, but differing in products, which may often be the indication of some modifying cause of climate not hitherto investigated. If it were possible either in schools or colleges for such instruction to be given by a botanist and a zoologist, we are of opinion that it would come better from them than from the geographer. But till science be more subdivided with the view of improving it, it is much better that the geographical distribution of plants and animals should be treated of, even imperfectly, by the teacher of geography, than that so useful and attractive a branch of knowledge should be entirely neglected in a course of liberal instructions.

ON GEOGRAPHICAL AND STATISTICAL KNOWLEDGE.

By A. VIEUSSEUX.

(From the Quarterly Journal of Education, No. XIV.)

Statistics, a term first introduced by the German writers, was defined by Achenwall, of Göttingen, to be the exposition of the effective components of any political society. This definition may perhaps be objected to by some, and indeed German writers are not yet very well agreed among themselves as to the definition of the term Statistics. Our object in this article is not to determine the exact limits of statistics, but simply to show the kind of information which is absolutely necessary for understanding the social and political condition of a country or nation; and having this object in view, we think that the term "political geography" expresses more nearly than any other that kind of knowledge of which it is our present purpose to speak. Political geography is the foundation of all political science, for unless we know the present condition of a country and its people, we cannot possibly reason correctly on their wants and wishes, and on the reasonableness of those wishes, or the means and chances there may be of satisfying them. This seems a truism, but it is a truism so often disregarded, that we think it necessary to assert it here as a proposition, the importance of which it is our object to demonstrate. The geographer, or statistician, gives the facts; the politician, the jurist, and the moralist, reason and speculate upon them.

But unless the facts be accurately stated, it is evident that all arguments drawn from them are inconclusive. Political geography is therefore a science of facts, and not of hypothesis or speculation; it shows things as they are, and leaves to others to decide whether they ought to be so, or are likely to remain so.

The elements of the condition of a country are of two kinds, natural and artificial. The former, which belong properly to physical geography, are, its extent and coast-line, the configuration of its surface, its position on the globe, and its climate, its boundaries, and the nature of the countries or seas which border on it, the quality of its soil, and the character of its rivers, its natural productions, whether mineral, vegetable, or animal, and lastly its population. The artificial elements, which, being the work of man, are temporary and susceptible of modification, or even total change, consist of the dwellings of the inhabitants, their agriculture, and other branches of industry and trade, which constitute the wealth and capital of the country; the civil and political institutions, the social habits of the people, their religion, and language.

It is the business of political geography to furnish data to show the influence which the various elements above mentioned exercise upon the intellectual, moral, and economical habits of a people, and upon their political condition. The natural or topographic elements of a country being mostly permanent, their influence may be calculated according to certain rules. Thus, for example, the civilization of Europe has been greatly promoted by its geographical position, its temperate climate, and its peninsular form indented by two large inland seas, the Mediterranean and the Baltic, and by

numerous gulfs and great rivers, all which circumstances must have facilitated colonization at first, and social intercourse and trade afterwards. Africa, massive and unbroken in its shape, with few navigable rivers, a burning climate, and vast deserts, has remained for the most part uncivilized to this day. And in Europe itself, which are the countries that have been most forward in civilization? Greece, Italy, and England. Greece, indented by numerous gulfs and creeks, surrounded by clusters of islands, affording numerous natural harbours, and placed on the threshold of Asia, and in a fine climate, was most favourably situated for commerce. Italy, long and narrow, with an extensive line of coasts, but with few bays or natural harbours, is inferior in this respect to Greece, while the want of tides in the Mediterranean sea renders the rivers nearly useless for the purpose of ship navigation. It is in great measure the want of natural harbours that has made Italy inferior in maritime commerce to Greece and to England. On the contrary, Greece is not so rich an agricultural country as Italy; she has not such an expanse of well-watered plains, nor so many fine valleys; her mountains are more rugged and bare. And in Italy itself, we find that Venice, seated on her group of islets, forming natural harbours and canals, soon felt the influence of her position, and consequently became the principal maritime power of Italy, and in latter ages the only one. Man may do much to correct local disadvantages, but he can seldom wholly conquer them. In some cases, the geographical advantages remain neglected, through the agency of other causes, but these are exceptions, and not the rule. The coast of Dalmatia, with its numerous bays, inlets, and islands, is

excellently situated for maritime trade, but Dalmatia having always been a dependency of other states, first of Venice, jealous of its commercial monopoly, and lately of Austria, its resources have remained comparatively neglected, and it has not derived the advantages which might have been expected from its geographical situation. Yet the Dalmatian sailors are the boldest and best in the Mediterranean, while on a spot of its coast where an independent state long existed, Ragusa was a centre of trade and maritime enterprise. So true it is that geographical position will determine the industry of a country, if not trammelled by external circumstances.

Navigable rivers are the great arteries of social life. The free towns of Germany during the middle ages, and those of Holland, are instances of this. What makes the striking difference between Egypt, where civilization is older than history, its origin being lost in the obscurity of the mythic ages, and the rest of Northern Africa, which, in spite of so many colonies and conquests from different nations, still remains in the same wild half barbarous state as it was two thousand years ago and more? The Nile has been the great civilizer of Egypt, while Numidia and Mauritania, mountainous, and destitute of large navigable rivers, have never admitted civilization to penetrate far into the interior. Again, Spain, square and compact in its shape, with hardly any navigable river, and its centre forming a high naked table-land, labours under great obstacles to internal communication, and accordingly has never been a great commercial country; while Portugal, narrow, with a long line of coast fronting the Atlantic Ocean, and two noble æstuaries, the Tagus and the

Douro, was for ages one of the great maritime powers of Europe. In the bleak north, the coast of Norway, with its innumerable ports, has been always a nursery of bold seamen. Manufactures may prosper in countries remote from the sea and from navigable rivers, and even on the mountains of Switzerland, as manufactures chiefly depend on the supply of fuel and water, and of the raw materials, which often are produced near the spot. In the case of bulky raw materials being brought from distant parts, the disadvantage of a remote internal manufacturing site is much greater. Those manufactures which, having these supplies at hand, are at the same time situated near the sea or a navigable river, must have a great advantage over all others. England unites all these requisites above every other country in Europe; its configuration, long line of coast, numerous natural harbours and navigable rivers, its inexhaustible supply of coals, its iron and tin mines, all these have established its supremacy in manufactures and maritime trade, and this supremacy it must retain as long as it retains its independence as a nation.

The natural elements of a country, by determining the industry of the people, influence at the same time their social and moral habits. The shepherd who grazes his flocks for one half of the year in the solitude of the Alps, the Apennines, and the Pyrenees, is a being of simpler habits, fewer ideas, and fewer words, than the labourer or artizan who lives in the crowded towns or villages of the plain. The nomadic Arab, being obliged to wander in quest of pasture for his cattle, lives constantly encamped, ever on the watch, and prepared for defence. He acquires habits of alertness and courage and of extreme sobriety. Milk and a few dates

are his general food. The Sheiks of the wandering Arab tribes, having no fixed habitations, no castles, or prisons, can only enforce their authority by popular consent. Hence the independent spirit of the nomadic Arabs, and the impossibility of conquering them, or at least of keeping them in subjection.

As we advance towards the pole, heat, as a general law, decreases, and the duration of daylight during one half of the year becomes more and more contracted: this occasions additional wants of fuel, warm clothing, and artificial light. The labourers of southern countries have fewer wants than those of northern ones, and therefore are less inclined to work hard. The precocity of women, and their early decay, in the countries near to or within the tropics, may account in a great measure for the custom of polygamy among many tropical nations, though polygamy is not confined to the natives of hot countries. The appearance of the sky influences the taste of the people for the arts. The sky of Greece and that of Southern Italy, their rich tints and brilliant appearance, the cheerfulness which they seem to spread over all nature, have impressed the people of those countries with a lively sense of beauty, and have contributed to form the style of their music, their poetry, and their architecture.

Climate affects the productions of a country, the habits of the people, and their commercial relations. The temperature of a country may be the result of the following circumstances: latitude, elevation of the surface, aspect or exposure to a particular point of the horizon, situation with regard to some great range of mountains, or to a sea or lake, prevailing winds, &c. The effects of mere latitude are often counteracted by

some other of the above causes: thus Bogota, Quito, and other places within the tropics, enjoy a temperate climate. The French side of the Pyrenees experiences a severer winter than the Spanish side of those mountains; the same difference exists between the Swiss and the Italian sides of the Alps. In Italy, the valleys on the Genoese and Tuscan side of the Apennines partake of the nature of southern countries; the lemon, orange, fig, and olive-tree grow there in full luxuriance, while the northern slope of the same range, in the countries of Parma and Modena, is subject to a long and bleak winter, and can raise none of the above-mentioned products.

The configuration of a country and the nature of its boundaries have a powerful influence on its political condition. There can hardly be a doubt that the insular position of England has greatly contributed to the preservation of its national independence. Where did Napoleon's armed myriads stop? On the shores of the British Channel, and on those of the Baltic Sea. It was the Baltic that saved Sweden from a visitation, after the conqueror had overrun Pomerania. Gioia, the Italian economist, observes that the Italian peninsula being long and narrow, with an enormous line of coast, is assailable on innumerable points from the sea; whilst on the land side, the line of defence formed by the Alps is weakened by the wide crescent form of that range of mountains, which offers numerous passes to invaders. Again, the great length of the same peninsula, intersected by the lofty Apennines, is a great obstacle to a unity of government, to the choice of a common capital, and to the amalgamation of its various populations. The difference in the climate, nature of the soil and

its productions, and consequently in the habits of the people, is very great between north and south Italy; Naples and Milan are countries quite different from each other.

Rivers and mountains are the common demarcations of political boundaries. Of the two, mountains form the more durable and secure line of frontier. Mountains generally separate races and languages, for the social and commercial relations of men mostly follow the direction of the waters that flow from each side of a mountain range. Hence arise similarity of interests, habits, sympathy, and a feeling of mutual defence.

A knowledge of the local circumstances of various countries is essential not only to the statesman and the politician, but to the merchant, the traveller, the soldier, and the general student. The merchant, by being acquainted with them, will avoid bad speculations, such as sending to tropical climates goods which are only fit for northern latitudes, for instance, stoves and thick woollen cloths to Brazil, and even, as we have heard it asserted, skates to Buenos Ayres, where it never freezes. Such blunders could only take place where men were very ignorant; and though they might not occur now as to places known by experience to the merchant, we may safely say that, if the whole coast of China were at once opened to foreign trade, very few mercantile men would be sufficiently masters of such facts as are already ascertained about China, to make a profitable use of them. A similar want of knowledge occasioned ludicrous but expensive mistakes in the mining speculations of Mexico and South America: steam-engines were sent to be worked on the mountains, in places almost inaccessible, where there was no fuel to put them in

motion, and no timber suitable for the most necessary purposes. Napoleon committed a great statistical error by remaining at Moscow after the town was burnt, and till the winter set in. He became convinced, when too late, of the fact that men and horses bred in a more southern latitude, and in the more western parts of Europe, cannot bear exposure to a Russian winter. By a knowledge of localities, blunders will be avoided in speaking or writing, such as talking of the trees bearing fruit in Biscay in the month of March, or of the smiling plains of the south in summer, where the fields, unless they can be artificially irrigated, are parched and withered by a burning sun. With regard to southern countries, people are too apt to indulge in gorgeous visions of a luxuriant vegetation, odoriferous groves, of seas ever blue, weather always genial, and breezes ever soft; they forget the summer drought, the want of water, the torments of thirst, the clouds of dust and sand, the swarms of flies, musquitoes, and locusts, and numerous poisonous creeping things, the summer storms and hurricanes, the scirocco and the khamsin, the malaria exhalations, the enervation produced by the climate, the consequent indolence of the people, and their early old age; they forget that a sun constantly bright in a sky constantly blue, month after month, produces at last a sense of weariness as great as that occasioned by a gloomy northern winter, and that the appearance of the equinoctial clouds, slowly and darkly piled one above the other on the verge of the horizon is as welcome to the inhabitants of those latitudes as the first warm days of spring to those of the British isles. The author of "Recollections of the Persian Gulf," quoted by Balbi, observes that the brilliant descriptions which several

writers have given of the south of Persia are most erroneous, although the authors of those descriptions cannot be charged with wilful deception, for they do describe things that exist, only they colour them so as to render it impossible to recognize them.

"Isles of palms, and banks of pearls, vine arbours, and groves of pomegranates, all these appear brilliant, fresh, and balmy, in the recital, but how different the reality! The groves of palms are stunted, straggling plantations, the pale and faded green of which is hardly distinguishable from the tints of the naked rocks which surround them; the pomegranates are covered with white dust; the pearl banks are heaps of oyster shells exhaling an infectious odour; the crystal springs are brackish water; the breezes are suffocating; and the vases containing melted rubies are nothing more than bottles of Shiraz wine, which tastes like bad port mixed with beer, with a piece of dirty rag for a stopper. Such are the attractions of the shores of the true Persian gulf—shores desolate and barren, under an atmosphere which withers every thing."

One consequence of these exaggerated descriptions is that travellers, on visiting the spot to which they refer, and finding themselves disappointed in their expectations, often run into the opposite extreme, and pronounce every thing detestable, the sky, the climate, the country, and the people. And persons who have not travelled, hearing such discordant accounts, become doubtful of truth altogether, and assume a sort of sarcastic and contemptuous scepticism concerning every thing connected with foreign countries, which they mistake for wisdom.

If we pass from the natural to the moral causes that

affect the condition of a people, we find the difficulty of ascertaining truth greatly increased, for here even personal observation is not sufficient, as every observer sees through his own peculiar medium. The mora elements of a state may be reduced to three heads: political, civil, and religious institutions.

The political institutions of a country include its legislative and executive powers, its political divisions and their administration, its financial system and mode of taxation, its military and naval establishments, &c. The civil institutions are,—the judicial, correctional, and police systems, the establishments for education, both elementary and superior, and the municipal or communal administration. All these departments and their ramifications are too often jumbled together under that most vague, unsatisfactory denomination, "government." Civil and political institutions are confounded together; no distinction is made between the administrative, the judiciary, and the municipal powers; we are told that, in one country, the monarch, in another the representatives of the nation, make the laws; but frequently we are not told to whom the administration of these laws is intrusted; and yet it is a fact that it is less on the laws themselves than on the manner in which they are administered that the welfare or misery of the people depends. No particular form of government is sufficient of itself to ensure the security and prosperity of a nation. All forms of government can be abused; an ignorant or corrupt majority may render a democracy insufferable to all honest men; and monarchy, in the hands of weak, ignorant, or wicked rulers, may bring ruin upon a nation. It is now generally understood that Prussia, although in its form an absolute

monarchy, is one of the best administered countries, and its people one of the best informed in Europe, owing to its universal system of popular education. Such is its present condition; it ought to be observed, however, that, under an absolute form of government, there can be no guarantee for the future continuance of an upright and enlightened administration. This is the great drawback; but at the same time, where the people are generally educated and moral, flagrant abuses can hardly occur; and if they should occur, they cannot be of long duration, for they would, in fact, bring about a change in the form of government.

"In Prussia," observes M. de Chambray, in his 'Notes' on that country in 1833, "the king, although called *absolute*, is in reality less so than the king and the ministry of France. He is not obliged to procure the approbation of the chambers, because there are no chambers; but he is obliged to obtain the tacit approbation of the nation, and of all the civil and military functionaries who owe their offices either to their merit as displayed in rigorous examinations, or to the suffrages of their fellow-citizens. The king could not engage in a war reprobated by the nation; he could not bestow the first employments in the administration on a mere favourite; and he could not make unjust promotions in his army."

When to these considerations we add the institution of the *landwehr*, or national militia, and the existence of the provincial assemblies, who give their advice on matters affecting their respective provinces, we find that we cannot class Prussia among despotic governments, although we think we can perceive too much of a military spirit in its organization. Dr. Hassel, in his

'Statistics of the European States,' draws a distinction between autocratic, or absolute, and despotic states. "A despotism," he says, "in the proper sense of the word, could not exist in Christian Europe in the present state of civilization. Even the most unlimited monarch is bound in some degree by the old laws and customs of the country, and still more by the feelings of his subjects, and by public opinion." Pure despotism is only to be found now in Asia. The Shah of Persia is more despotic than even the Turkish Sultan.

The judicial system forms a most important element of the condition of a people. In order to judge of it, we ought to know something of the written law of the country, of the formation of the courts, of the qualifications and authority of the judges, and by whom they are appointed and paid; also of the practice of the courts, the forms of trial, the modes of punishment, the regulations of the prisons, &c. Few geographical and descriptive works give us any idea of all these matters; and yet the security, the personal liberty, the property of every individual, are dependent on them much more than on the political form of the government. The Swiss republics, which have enjoyed political freedom and independence for five hundred years, have had all this time a most wretched judicial system. The judiciary power was often confounded with the executive. The punishments were barbarous; the pillory, branding, and flogging, were in use; torture was frequently employed, imprisonment and banishment arbitrarily enforced, suggestive interrogatories and other modes of extorting confession were in use,—in short, all the iron code of the Gothic ages was in vigour. It is only within a few years that some of these barbarous practices have been

abolished. The same vices existed in the Italian republics of the middle ages, and in those of Venice and Genoa till our own time; Tuscany, on the contrary, under the absolute rule of Leopold, obtained an excellent code of laws. But it is not enough that the laws be good; they ought to be justly administered. The best laws are of no value if those who administer them are corrupt; and this shows the importance which ought to be attached to the choice, qualifications, and independence of judges and magistrates. Again, the civil, criminal, and commercial laws ought to be examined separately, as well as the mode of proceeding before the various courts, or what the French style *code de procédure*. There are many people who talk of and extol the Code Napoleon, who probably are not aware that there are five distinct codes included under that name, two of which, the civil and the commercial code, really deserve praise. The penal code is vicious in many respects, and bears the mark of the arbitrary spirit of the ruler under whom it was compiled. Penalties are disproportionate to offences, and many enactments, especially those concerning the conscription and offences against the state, are tyrannical. The sentence of confiscation, which accompanied that of death in several cases, was abolished only under Louis XVIII. The penalties against associations, or assemblies, literary, religious, or political, consisting of more than twenty persons, remain in force. The punishments of vagrants and mendicants are harsh beyond reason and justice. The code of "criminal instruction" or proceedings does not always ensure a fair trial; we can only refer the reader to the collection of modern "Causes Célèbres" for an illustration of this. The discipline

of the prisons is sadly defective, in common with that of most other countries, but the treatment of the convicts sent to Toulon and Brest is truly revolting to humanity. The laws concerning insolvent debtors are very harsh, especially with regard to foreigners. The *code de procédure civile* also is encumbered by numerous forms and technicalities, to which in many cases right is sacrificed. *La forme l'emporte sur le fond*, as we have heard French lawyers remark. Under all these regulations, very dissimilar in their spirit from the political principles recognized in theory, individual liberty is practically very circumscribed in France. Police measures interfere at almost every step with the free agency of the citizens. This shows the necessity of discriminating between the laws and their administration, between theory and practice, between civil and political liberty, in order to ascertain the real condition of a country.

The municipal or communal system of a country is another essential part of its social condition, but generally the least attended to. Historical and political writers are very minute about the higher branches of the general administration of a country; they tell us of kings and councils, of parliaments and representative states, of ministers and governors, of finances and the military force,—in short, they exhibit to our view all the great scaffolding of the central government, but leave the humbler machinery of the local administration of the country towns, districts and villages, communes and parishes, generally unnoticed. And yet how much of the peace and comfort of the great mass of the population, especially the rural part of it, depends on the proper arrangement of these matters. How many

families may be injured, how many humble beings, men and women, may become broken-hearted, and their prospects blasted, by a tyrannical municipal or local authority left uncontrolled. People of simple habits or conditions, such as the agricultural populations mostly are, care much more about their justice of the peace, their priest, and the local collector; the manner in which the local taxes are levied and employed; the regulations about their markets, roads, and public-houses, than about questions of general government, which they do not understand.

"The bond which unites together the inhabitants of a commune," says an enlightened living French writer,* "is real, and more powerful than laws; it is the result of hereditary habit: the peasant loves the steeple of his parish church; the recollections of his life are centred in that church: in the adjoining burying ground his fathers lie interred. The cross-roads lead to the parish village. The peasant is attached to the curate who performs the service every Sunday; who has christened and married him: he would not like to take his child to be baptized, or send his boys to school, in the next village; a feeling of self-love, a sort of narrow patriotism, binds him to the little world around him."

It is the remaining system of *ayuntamientos* and the popular election of the alcaldes that has kept up the spirit of the Spanish peasantry under all the weight of despotism, bigotry, and the inquisition. As long as the alcalde was one of themselves, who knew their habits and their wants, and was controlled by the popular voice, the Spanish peasantry cared little who was minister at Madrid, or captain-general in the pro-

* De Barante, *Des Communes et de l'Aristocratie.*

vince. And it is remarkable that in some of the most absolute monarchies that grew on the ruins of the feudal system, the principle of popular election in the rural districts has remained most firmly rooted, and has proved in reality most useful as a protection to the great mass of the people. It was, and is still found in the Papal and Neapolitan states, trammelled though it be, and gradually encroached upon by the central power; the Venetian senate maintained it in Frioul, and other conquered provinces; and it exists now where a superficial politician would least expect it, in Turkey.

The conquest by the Turks swept away all privileges, all monopolies, and likewise all disabilities from among the conquered races, in those districts which submitted unconditionally: the inhabitants selected from their own body the fittest persons for filling the office of assessors, collectors, and cashiers: for the collection of the taxes or tribute was the origin of the municipal bodies throughout the country. The absence of all exclusion and restriction under the common yoke left no grounds for strife: all had an equal right of suffrage, and the only question at issue was the personal merit and character of the individuals to be chosen. The Turkish system of direct taxation prevents what we should consider opposing interests from clashing together. Public opinion is made manifest through the public voice, and the elections are concluded in a few minutes, either in the church after the service, or under the village tree, without agitation and without formality. The elders when elected hold their office for one year, yet they may remain in office for years, or even for life, without re-election; but if they lose the public confidence, no re-

turning day of election is waited for—they are immediately ejected, and successors appointed. Their principal functions are,—the apportioning the tax imposed upon the whole community to each individual according to his property. They must, therefore, be accurately acquainted with the property of each member of the community, his means of livelihood, his profits, and his industry. It is their duty, by timely counsel, admonition, or reproof, to prevent the negligence, inactivity, or misfortunes of any individual from adding to the burthens of the rest. They assess and collect the poll-tax, house-tax, and land-tax, and many others, which, in their mode of collection or repartition, vary in almost every village, but always depend on a scale of property. They manage the municipal funds with which they pay for lodgings and provisions afforded to Turks, soldiers, couriers, &c., passing through the place; for presents or bribes to governors, and other incidental expenses; also the interest of the debt with which almost every community in Turkey is burthened. Their civil functions are the following. They distribute lands left uncultivated, or without an heir. In transactions between merchants and members of the community for cheese, butter, wool, cotton, or any other produce, the contract is legalized by the signature of one or more of the elders, who thus become security for their townsfolks. Purchases are only legal when witnessed by them. Together with the priests, they decide on all disputes, settle disputed water-courses and successions, and maintain a species of government rather preventive than repressive. The office of arbitrator or judge belongs more particularly to the priest. In the provinces, the bishop is judge of the Christians; by his *berat*, his judgment is final

in matters of marriage and divorce. In secular matters they are guided by the pandects. In the small communities or rural districts the priest is judge in matters which are not of sufficient importance to be carried before the bishop. The Mohammedan law is not in operation among the rayas, except in matters in which Turks are concerned; and these are few, as Mussulmans and rayas cannot be mutually trustees, guardians, &c. Although the Turks do not recognize any judicial authority, save that of the Mussulman Cadi, imperial firmans granted to several districts expressly forbid all interference with decisions which have been given by any arbitrators whatever, chosen by mutual consent of the parties. The Turkish law necessarily interferes only in cases of public violence.

"These institutions alone," adds Mr. Urquhart, from whom we have extracted the above interesting particulars, "could have preserved to the Greeks their astonishing uniformity of character, language, and creed, and produced their submission to the Turkish dominion. Every individual is a guarantee for his neighbour's obligations, a security for his person, and consequently a censor on his condition and morals. It is not the influence of the priesthood, or even of religion, that produces their firm adherence to their creed; it is respect for the opinions of the little community to which they belong, it is the moral authority, the support of fellowship and friendship that results from the close pressure of man and man, and the strong linking of interests, and opinions, and affections, under the municipal bond, which is the only law of the Turkish raya." —*Turkey and its Resources*, p. 23—39.

This municipal system is common to the Greeks,

Armenians, and Bulgarians. The Albanians, Guegues, Bosniacs, Croats, and Sclavonians, do not possess these institutions, but have ever been subject to odjacks, knezes, and beys, or military chiefs.

"Amongst these races, men, instead of coalescing, seem to fly each other; no villages are to be seen huddled together, but insulated *soïs*, or clans, have perched their little towers of defence among the rocks, and scattered them over the mountains. The Mirdites alone enjoy a species of autonomy; they also retain their creed. In fact, through all the modifications of climate, position, and race, the original creed co-exists with the autonomic institutions; and in the absence of these, Islamism is found. The descendants of the warriors of Scanderbeg and the defenders of Scodra are now Mussulmans; the next to impregnable fortresses of Colonias, Dibre, &c., where military chiefs held their ground, have readily admitted the supremacy of the crescent; the plains of Thrace, devoured by locusts of functionaries, trodden down by the unceasing passage of fanatic hordes, but where distinctions among the tributaries were swept away, still cling to the cross."—*Id.* p. 43.

In studying the history of municipal bodies in western Europe, we ought to distinguish between the urban municipalities or chartered corporations of the middle ages, and the rural municipalities, or rather commonalties. The former arose in the towns or burghs out of the chaos of feudality, and were unconnected with the surrounding country. They represented imperfectly the ancient Roman municipia, from which they took their name. They enjoyed privileges and monopolies rather than liberties, and this was at the expense of the country around. Such were the imperial towns; and

such several of the Swiss republics, Zurich, Bern, Basle, Freyburg, remained till very lately. In Italy, France, Spain, and other monarchies, the urban municipalities lost their privileges; the crown, having once conquered the nobles, attacked the immunities of the towns, and assumed the right of nominating the municipal authorities. But the rural districts were left in most of these countries undisturbed in the enjoyment of their popular administration, and this was no small boon to them. In France, strange as it may sound, all municipal and communal independence was destroyed by the republican constitution of 1795. It was sacrificed for the system of centralizing all administrative power in the capital, which has remained in vigour ever since, and was introduced by the French into the countries which they invaded. The attentive observer and investigator of all these and similar facts will easily account for the apparent anomalies in the conduct of the peasantry in several parts of Europe during the political vicissitudes of the last forty years.

The religion and religious practices of a people are matters of too serious importance, they exert too great an influence over its intellectual and moral habits, to be passed over slightly by any wise man. In themselves they cannot be fit objects either of blame or ridicule, for in most cases they are above the choice or control of the individuals who profess them. To the political geographer they are essential facts, which he must take into account, together with their ascertained consequences, in his estimate of the condition and capabilities of a nation. Not only the religious belief, but the manner in which that belief is promulgated and enforced, and the influence which it has upon the civil and social state,

upon the domestic and economical habits of its disciples, ought to be noticed. The perpetual celibacy enforced upon whole classes of men, the abstinence from certain articles of food, the number of holidays, the moral censorship exercised in certain countries by the parish clergy, the religious regulations of marriage and divorce; the offerings, the dues, the sacrifices exacted by various forms of worship, the spirit of proselytism of some, and the intolerance of others, the fatalism of the Mohammedans,—all these are facts which influence the condition of millions. The shallow-minded scoff at them; the attentive observer acknowledges their power, discriminates between their evil and their good effects, for there is hardly a form of religion that has not some good points about it; and if he be a right-hearted man, he will pity the aberrations of the conscientious votary, while he will expose the hypocrisy of the wilful impostor. Connected with the subject of religion, although distinct from it, is the establishment for its worship. The number of the clergy, their mode of education and ordination, their various ranks and gradations, their relations with the other classes of society, their means and mode of living, the distinction between those who have the charge of churches, parishes, or districts, and those who are without any fixed duties; between those who live in communities, such as monks, friars, dervishes, &c., and those who live alone, either single or with their families; the amount of their income, collective and relative; the establishments appropriated to their instruction—all these are subjects of inquiry for the political description of a country, as well as the division of that country into parishes and dioceses, the number of churches and temples, and the mode of religious and moral instruction

afforded to the people. Statements concerning these matters should be made upon authentic authorities, when these can be obtained, and not vaguely exaggerated or distorted after the manner of an absurd estimate which found its way not long since into several periodicals and newspapers concerning the clergy of Spain, in which the number of Spanish archbishops and bishops was stated to be above 700; the parishes 127,000; the convents and monasteries 181,000; and the monks, nuns, and secular clergy, in round numbers, about 1,000,000, that is to say, about nine times as many as the reality. A single glance at the map of Spain might have shown the impossibility of the thing. The mere knowledge of the gross amount of the population of the peninsula would have shown the fallacy; every third grown-up man, according to this statement, must have been a priest or monk. The mistake has arisen from having confounded the statistics of the whole Spanish monarchy, with its immense foreign possessions, in the time of Philip II., with those of Spain in the nineteenth century.

The importance of education, elementary and scientific, school and collegiate, its immense influence over the moral, domestic, and economical habits of the people, and their social and political condition, cannot be doubted by any person of common sense. In a geographical inquiry, due attention should be paid to the difference between the establishment for popular and elementary education, of which all are susceptible, and which all ought to have in a well-regulated country, and those appropriated to scientific instruction, which, in the actual state of society, can only be administered to comparatively few, the manner in which those various

establishments are administered, the funds by which they are supported, &c.

And lastly, political geography should consider the population of a country with regard to its descent or race, and its language. Without entering into the question of the origin of races, it can be safely asserted that various nations have each peculiar features of character and disposition. Some of these appear to proceed from the climate and nature of the country, while others are retained even after emigration. Some races are lively, others sober and calm, some rash and impetuous, others thoughtful and cautious; some are impassioned and amorous, others phlegmatic and cold. These are facts which, when generally ascertained, ought to be stated, as they may exert considerable influence on the political condition of a people. Language is another important element of geographical classification. It generally, but not always, accompanies the distinction of races, and also frequently determines their political boundaries. Populations speaking different languages, or at least languages of different origin, will seldom voluntarily amalgamate. Language is the reflexion of thought, it is the mirror of the feelings and sympathies of a people. Ignorance or carelessness of these distinctions in a reasoner on general politics produces an unpleasant discord to the ears of the better informed, and spoils the effect of his otherwise plausible arguments. We will quote one instance out of many. In the late contest between the Sultan and Mehemet Ali, Pasha of Egypt, Ibrahim, Mehemet's son-in-law and general, while besieging the fortress of Acre, being asked how far, after the taking of that place, he meant to advance, is reported to have answered, "As far as I

can make myself understood in Arabic." Arabic is the prevailing language in all Syria, as far north as the chain of Mount Taurus, which divides that country from Anatoli, or Asia Minor, where Turkish is the language of the country. This expression, so graphic and so significant, has been completely spoiled in a paper on the present state of the Turkish empire, which appeared some time since in a contemporary Journal. The writer puts the above words in the mouth of Ibrahim, not at Acre, where he had still a vast tract of country before him where Arabic is spoken, but at Konieh, after his victory over the grand Vizier in the centre of Asia Minor, where Turkish is the language of the people, and where, therefore, the sentence would have been absurd, as Ibrahim had left far behind him the boundaries within which Arabic is spoken. He had crossed Taurus, and advanced into Asia Minor, in order to oblige the Sultan to give him the countries in which Arabic is the language of the people, and into which he withdrew as soon as the demand was granted. The distinction is more important than it would seem at a first glance. The power of Mehemet Ali is essentially Arabian; it is supported by Arab troops; and his dominions extend over a country in which the Arab language and race have been long predominant from the time of the Caliphs; while the Ottoman's direct dominion on that side extends chiefly over countries where the Turkish and Turcoman races who came from Tartary are become indigenous. It is, therefore, a clearly marked ethnographic as well as geographic division, and, as such, likely to prove permanent.

We have now briefly stated the various branches of geographical information, which are necessary in order

to constitute a man thoroughly acquainted with the actual condition of any given country. We do not mean to say that they can all be attained in every instance, and we do not intend to discourage our readers, if they should find that in many cases much of this information is beyond their reach; let them endeavour to obtain as much as they can of the information above specified; the more they collect, the better qualified they will be to form an opinion. But to imagine that, without taking pains, without making any of the inquiries alluded to, by means of mere vague information gathered from indiscriminate reading, from conversational hearsay, from scraps of newspapers and travellers' sketch-books, a man can be enabled to talk pertinently about a foreign country, and pass his judgment on the people, is a fallacy which strikes us as most palpably absurd.

With regard to the sources from which geographical and political information may be derived, we may remark that professed statistical works, which are now fast multiplying in most European countries, and which give the various heads that we have noticed, ought to be consulted in preference to mere desultory and general descriptions which are deficient in classification. For each particular country, statistical works by natives of the same, where such can be obtained, ought to be preferred. And on this occasion we cannot too much recommend the study of foreign languages, as a most useful medium of correct information on foreign matters. It is almost impossible to ascertain many facts without applying to native authorities. Maps are another indispensable auxiliary for obtaining correct geographical knowledge. There has been, till lately, a

great deficiency in this respect; maps were generally bad and dear. There are now very good maps published in France, Italy, Germany, &c., of the various divisions of those countries; but they are difficult to be obtained in England, and they are expensive. The maps published by the Society of Useful Knowledge have been constructed on the best existing authorities, and their extreme cheapness makes them accessible to almost every one.

We would now, in conclusion, address ourselves particularly to *writers* on foreign countries, whether geographers, travellers, essayists, novelists, or contributors to periodicals. We would impress upon them the propriety, the necessity, of discriminating and ascertaining facts before they put forth their statements; of making use of the art of a critic in examining their authorities; of avoiding generalities and the use of superlatives; and of such hackneyed epithets as "barbarous, slavish, fanatical, bigoted, lazy, cowardly," which are seldom applicable to whole nations, at least within Europe; of stating facts before opinions, and, when they have no facts to state, of not dealing in surmises and hazarded inferences. We have already exemplified our remarks on this subject in speaking of Italy*; we may do it again with regard to other countries, for we think it is our duty to combat error under whatever shape it may show itself. No national or political partiality ought to stand in the way of truth, for error can never be a good auxiliary even in a good cause. We would impress upon all writers a due sense of the responsibility which they incur by propa-

* See Nos. IV. and VIII. of the Quarterly Journal of Education.

gating erroneous or hasty judgments and opinions. Men should be even more cautious about what they write than about what they speak; but we fear the reverse is most commonly the case. What is said in conversation is often unheeded, and generally forgotten; while everything that goes forth in print is sure to attract the attention of many, perhaps of thousands, and to be remembered by some. Hence the mass of prejudices, already, one would think, sufficiently great, is daily increasing. And that prejudice will bring forth practical mischief, who can doubt? In these times, when most people read something, the danger becomes much greater. In countries where a great proportion of the people take part in political questions, and have a voice, although indirect, in the legislature, who can calculate the consequences of erroneous impressions spread among them concerning other countries? It is not the first time that nations have waged destructive wars against each other through irrational prejudices which they had imbibed from their parents or teachers. At all events, war has ever been carried on in a deeper spirit of atrocity when one or each of the parties looked upon the other as barbarians, slaves, or infidels. Witness the wars of Rome, those of the Turks, and others which we might mention. Men feel little compunction in tormenting and exterminating those whom they consider as a degraded race.

STUDY OF NATURAL PHILOSOPHY.

By A. DE MORGAN.

(From the Quarterly Journal of Education, No. V.)

One of the first things which will strike an observer of modern education is the fact, that there are now few young people, in the middling and upper classes, who do not early receive some explanations, or what are intended for such, of the phenomena of nature. Not only do most parents conceive themselves qualified to give their children the first lessons in physics and astronomy, but the works of amusement which are so constantly in the hands of little boys and girls generally contain some information on the subject. Since it is certain that the reasons and methods of arguing which are applied to sensible phenomena are more likely to obtain a hold on the mind of an infant than any other whatever, it will appear of considerable importance to all who rightly estimate the force of early impressions that the first inquiries on this subject should be answered in a rational manner. To many it appears of little consequence what a child learns, as long as he is, in the common phrase, kept out of mischief. On this head we commence with a few observations.

It is often assumed that the most important object of education, namely, the formation of character, is entirely attained by teaching the principles of religion and morality; that is, it is not suspected that the manner in which other things are taught to the child has any

effect upon the *moral* feeling of the man. It would be thought ridiculous by many were we to assert that evil is often chosen in preference to good, not from any lack of desire to do what is right, but from a want of means to distinguish clearly, in difficult circumstances, where the proper course lies. This opinion we are, notwithstanding, disposed to maintain, even to the extent of saying, that more evil is done by misdirected than by dishonest views, and that the accumulated mischiefs arising from error are of greater prejudice to the advancement of society than those which have their origin in abandonment of principle. There are but few who can say that the greatest portion of detriment which has arisen to them out of the conduct of others has proceeded from malignant or dishonest intentions. This being admitted, we must look for the rise of much evil to some other source than intentional departure from the principles of morality; and we have not far to go, if we recollect that the rules which are laid down for the guidance of any one member of society in his multifarious dealings with the rest are few and general, frequently misunderstood and as frequently misapplied. The first arises from the vague and erroneous use of words, the second from the want of habit of seizing all the circumstances of a case, and of reasoning correctly upon them. And this being the state of the majority of mankind, the criminal designs of one may be advanced by the errors of thousands. Thus a potentate, who incites his people to slaughter, declaring that God is with him and will fight against his enemies, utters his blasphemous nonsense in the conviction, that, of all whom he addresses, the few who have been taught to think are no match for the many, high and low, who are incapable of any such exercise.

At this moment we see hundreds on the verge of crime and misery,* because they cannot see through the misapplication of a few words. Never was there a time when it was more clearly shown that ignorance produces as many disasters as malevolence; and though unfortunately it is not yet universally true that better principles of education have reached the lower as well as the middling and upper classes of society, yet the obvious good effects of enlightenment, where it exists, upon the former should tempt those engaged in the instruction of the two latter to inquire, whether all the good which is attainable is yet attained, and whether there is not room for suspicion that the bad habits of mind, which, in their extreme state, lead to such fearful results, have always been producing a pernicious, though more quiet effect upon that portion of mankind which is supposed to have better opportunities of instruction.

The first education of children, though not formally called by that name, consists in the answers which are given to the numerous questions put by them on the nature, object, and cause of every phenomenon which catches their attention. The intelligent, and frequently unanswerable, inquiries of an infant, whose thoughts have not yet been chained by our common routine of expressions, and whose appetite for investigation has not been destroyed by receiving only words where he looked for ideas, furnish a lesson of no small profit to the philosophic observer. The first impulse given to mental action is the result of an instinct of curiosity, a desire to search to the very source the cause of all that is seen and heard. Hence children of any intelligence break

* This was written at a time of great political excitement, when there were people who imagined that a conviction that their own *rights* were attacked gave them a *right* to abolish the *right* of their opponents to live in peace in their own houses.

and destroy their playthings, in order the better to examine their construction; and here begins the *manège* by which they are converted from inquirers into machines. Parents and nurses reprimand their charges for the indulgence of this desire to learn, and repeat for the ten-thousandth time their wonder that children love mischief. Under this last emphatic word is included all that can give any trouble to an instructor, or by any means lead him to suspect that the desire of knowledge comes without his assistance, and all that is asked of him is the direction of it to proper objects. But since it is of consequence to repress this same desire of knowledge, and since the temper of the times no longer allows of accomplishing this object by force, either in boys or men, the method employed is to be provided with a stock of unmeaning words, mostly derived from the Greek, which are to be applied to the complete elucidation of all causes, final and secondary; the teacher endeavouring to look as if he understood them himself, in which, to do him justice, he generally succeeds. Above all, he must never fail of giving some answer to every question, since to confess ignorance would perhaps reveal to the child that he is neither to know nor to expect to know all things; and this is not expedient. If, by any means, he should be unprovided at the moment, he must tell the pupil not to "ask questions," which, next to the destruction of playthings, is the second great offence of childhood.

To see the manner in which words are applied to the extinction of the desire of knowledge, let us take an example of the contrary method, where they are used in a reasonable manner. In the "Lessons on Objects," reviewed in the first number of the Journal of Education

the word which expresses a quality is introduced in the following way. The attention is first directed to the quality itself, in repeated instances of its existence; the sensible idea actually presented is dwelt upon and expressed, if it may be, in common phraseology. The single word which denotes the quality is then introduced as soon as the want of it is felt, and not before. It will be observed that the word is made the *name* of the quality and not its *explanation*. The usual way to convey the meaning of a word is as follows: A child asks, "*Why* can I see through the window and not through the door?" The parent puts on the face of a Socrates, and answers, "*Because* the window is *transparent* and the door is not." The child is therefore led to think that a long word is a sufficient explanation, and, worst of all, that a new word is all he should look for in any case. He imagines that his papa knows everything, and that he himself will be as wise some day. Hence springs what is called the pride of knowledge, which is, in most cases, the direct consequence of ignorance. But suppose it should be thought worth while to tell him, in simple language, that the answer to the question, "Why," in the sense in which it is put, is in most cases impossible, in the present state of knowledge; that the word "transparent" is not the reason of the phenomenon, but the name of it; that we must know more about light and glass before we can pretend to explain *why* the first should pass through the second; that when he is older he may learn many useful and curious things about the two, but that, go as far as he may, there must always be some part of his question left unanswered,—would his knowledge be less, or would he be likely to make a worse use of it, than when he is left

to suppose that all the mysteries of nature are within his reach, as soon as he has got out of words of one and two syllables? The frequent misuse of the words "why" and "because" has produced a little work, containing many things which are true enough, but perverted by being formed into a catechism of questions beginning with "why" and answers with "because." For example: "Question. Why is ice broken before it is stored in wells? Answer. Because it may reunite in the interior." We say nothing of the method of teaching words as an exercise of spelling only; since, common as it once was, it is now, we hope, nearly exploded; and it is admitted, that he who knows nothing of such words as "transparent," except by t-r-a-n-s trans, p-a pa, r-e-n-t rent, transparent, can never be entitled to any other appellation than i-g ig, n-o no, r-a-n-t rant, ignorant.

But the evil is not by any means confined to the explanation of such qualities as are sensible; it runs through the notions of physics which are given to children to an extent which all will find some difficulty in correcting when they attain mature age. Granting that there are few grown people who would not, after a moment's reflection, agree with the censure in our last paragraph, we do not think there are so many who will coincide with us in what follows: We assert that the explanation of more complicated phenomena, as given to young people, is a traffic of unmeaning words, or, if there be any meaning, of errors and misconceptions. To prove this, nothing more is necessary than to recall the usual modes of elucidation, and particularly those contained in the story books of which children are so fond. We recollect distinctly seeing it asserted in one of these that the immortal Newton was the first who

discovered "why water runs down hill;" and we have a brilliant instance in the following, extracted from a book of very modern date. The first paragraph is most remarkably clear, and the second must show that the opinion entertained of the sagacity of Newton has a better foundation than is generally supposed. Talking of the rainbow, "All those drops which are situated at the same angle all round the eye will of course be of the same colour, and as different colours will arise at different angles, a bow composed of regular circles is a necessary consequence of showers of rain." "The colours of the rainbow thus beautifully described," alluding to a preceding quotation, "led our great philosopher to conclude that these colours, as well as colours in general, are produced by some property in rays of light." We could produce many others, but these are sufficient. The fact is, that a name, as before, is made to take the place of a cause: thus it is held sufficient to say that a stone falls to the ground, *because* the earth attracts it, or because there is a natural tendency in all bodies to fall to the earth. The pride of ignorance here prompts an explanation, which has no meaning whatever in the mouths of most of those who use it. They might take a lesson from the very children they teach, who will, when hard pressed for a reason why a thing is so, answer "Because it is." Let instructors and those who write explanations content themselves with reducing their ultimate knowledge of physical phenomena to deductions from the evidence of the senses, not seeking to penetrate nature for laws, which are only names given to collections of phenomena, and then laying down their laws *à priori*, and reasoning from them instead of to them. Let them reflect, that whatever

consequences may be deduced from the combination of principles, it is their business to ensure the right reception of the principles themselves, not as dogmas or truths obtained by an unknown or mystical process, but as inferences from sight, touch, and hearing, the most direct and most conclusive of which our nature is capable. The track which should be followed is that of discovery, the ability to pursue which is nearly universal, though the sagacity to mark it out is the gift of few. Having directed attention, for example, to numerous instances of gravitation, and shown that some things which appear to be exceptions are not really so, it is easy to say, that the name of gravity is given to the cause of all these phenomena, and that of this cause, its nature, or mode of action, we know absolutely nothing, and only use the name as a means of forming into one class phenomena which we have the strongest reason to believe arise from a common cause. This, when sufficiently developed to be intelligible to a child, would, independently of its being truth instead of fiction, have the advantage of giving a check to the nascent presumption which is the characteristic of so many semi-philosophers, who imagine that their catalogue of hard names is the key of the universe. Not that these are found in the front ranks of science; they are, in fact, the matured results of that tuition which explains the falling of a stone by one word, and are to be found in drawing-rooms and conversaziones, where doctrines may be heard from them something like the explanation of a steam-engine given by one of Horace Smith's characters, viz., "There is a thing that goes up and down, which is the hydrostatic principle."

To return to our subject: if it be objected, that this

is giving nothing but words, we answer, that it is giving words to notions already formed by the method of instruction, and that words thus obtained are a valuable acquisition. It may be urged, however, that after all the pains which have been taken to give a right perception of the use of terms implying causation, the pupil will in many cases attach something mystical to their meaning. It may also be said, that even the best informed, from habit and the tendency of the mind to rest its ultimate notions upon a cause, however obscure, commonly use the words as implying an unknown cause, though in reasoning they confine themselves to phenomena. There is much truth in all this: with regard, however, to the latter case, there is no great disadvantage, since the vulgar error does not enter into the speculations of the philosopher, who, in giving a common name to a collection of phenomena, does not bind himself to any hypothesis with regard to any new fact which he may observe. There is an instance somewhat similar in pure mathematics. The terms infinitely great and infinitely small are in common use, not as the attributes of any quantity whatever, so much as the means of avoiding circumlocution in talking of increasing and decreasing magnitudes. If, indeed, the words of all the sciences were collected, it would be found that there are many, which, taken quite literally, are absurd, but which are so fixed by custom, that it only remains to explain them into common sense, and to use them in the sense so obtained. With regard to the first-mentioned difficulty, viz. that beginners will be apt to use the terms of physics as implying more of the causes of phenomena than we are entitled to assume, there are two remedies; the first, to direct particular

attention and examination to this point, making the pupil frequently explain the sense in which he uses the words, and repeating over and over again the same instructions. The second method will require a fuller detail of explanation. Since the first step to be made is the collection of a large number of phenomena, and their distribution into classes, keeping together in the same class such as obviously resemble each other, one division may be perfectly well distinguished from the rest by simply mentioning the fact which the phenomenon presents. Thus the falling of a stone to the ground will be the representative of one class, the rising of smoke and vapours of another; which must not yet be confounded, since it is the object of the method to take nothing for granted, but to proceed directly from the evidence of the senses. Such a course is followed in natural history, where a collection of animals, having the same characters, is called by the general name of the most common amongst them. Hence, when the pupil refers a phenomenon to the same class as that of a stone falling to the ground, he makes the same advance in real knowledge as another who says that it is an effect of gravitation, and in a more rational manner. When each phenomenon is reduced to that class to which it most evidently belongs, it may be shown that there is a closer connexion between two or more of these classes than would at first be suspected; and also that some of the phenomena which have been observed cannot exist without others. The process of strict deduction here commences; and care must be taken, when any point, however trivial, is assumed, to state clearly in what the assumption lies. Thus, before deducing the fact, that the moon would, if its motion were suddenly

stopped, immediately begin to move towards the earth, it is assumed that the moon is composed of matter which is subject to the law of inertia, as it is commonly expressed. In this manner, and by strict attention to reasoning, which a child is perfectly capable of understanding, though not of originating, a system may be formed, which shall exhibit the primary connexions of natural phenomena, as far as we certainly know them, leaving the mind of the pupil perfectly unbiassed by any notions respecting the occult qualities with which we, in our hurry to say we know the cause of every phenomenon, have loaded the study of natural philosophy. A work which shall lay down these principles in an easy style is much to be desired; and it is equally to be regretted, that those who are capable of executing this most difficult task are either indifferent to its importance, or think it too great a condescension to write for children. The books which do exist are either full of unintelligible jargon, or confine themselves too much to accounts of mechanical contrivances. Even the matters which they pretend to explain are usually couched in language which a child cannot understand. The following are examples, selected from a popular catechism:—

"Q. What is meant by the constitution of matter?

"A. The relative number of atoms that are in a definite portion, or mass.

"Q. What do you mean by an atom?

"A. The name signifies that which cannot be further broken or divided, and therefore an atom is the smallest portion of matter that we can imagine to exist; smaller, of course, than the least object that can be seen by the naked eye, or even the finest microscope.

"Q. Is it necessary that an atom should be invisible?

"A. Yes; for if we could see the whole, we could also see the half, and it would be a mass, and not an atom.

"Q. Have atoms any other properties than indestructibility?

"A. Being the ultimate limit, beyond which we cannot go in the division of matter, they are necessarily all equal to one another."

Take the following as a specimen of clearness, admirably calculated for a child of ten years old to learn by heart:—

"Besides the general attraction of gravitation, which belongs to matter as such, without any reference to the particular form in which matter exists, there are modifications that arise from the constitution of different masses; and to these are owing the different kinds and qualities of matter that we meet with among the productions of nature, and some of the products of art."

We should not take notice of such nonsense as is here exhibited, were it not that we have reason to believe it is extensively circulated. Many who understand the subject, but who have not had occasion to examine into what is written for children, have no idea of the state of instruction in this respect. It is true that there are better works: for example, Mrs. Marcet's "Conversations on Natural Philosophy," which, though not free from some of the defects to which we have alluded, is infinitely superior to the productions from which our instances are taken. But the works from which children derive their first ideas are the little books of amusement, from one of which we quoted at the begin-

ning of the present article. Great talent has been of late years applied to this department of literature; but, as might be expected, few of the authors have possessed that commanding knowledge which is absolutely necessary for teaching the first principles of physics. No mistake is more common than the supposition that a very slight acquaintance with any subject is sufficient to teach the rudiments to beginners.

There is one error which prevails most extensively in education, and which we here mention with regard to our present subject. It is the practice of measuring the advantage which a child has gained from any particular method of instruction, by the number of words which he has learnt in the process. Thus, a great quantity of names in different languages, and a power of pointing out on what part of the globe lie the places which they designate, is called a knowledge of geography. Not a single inference with regard to any one people on the face of the earth can arise from this training, for no facts are furnished which can settle the question, whether the map from which the pupil learns is at all the better for being a real representation of the earth, or whether it would not do equally well if the teacher contrived an atlas for his own school, and filled it with names at pleasure. A similar practice prevails in communicating physical, and particularly astronomical knowledge. The habit of teaching by catechisms, or by causing the pupils to "say lessons," has degraded this truly noble branch of education into a mass of words, and words only. Nay, even those parts to which nothing could be objected, if they were intended for adults, lose their effect from containing words and phrases above the capacity of children. It may be asked, how such a state of

things exists, when the wish for improvement has become so general, and attempts have been made for this purpose, sufficient, it might be thought, to constitute a fair trial of its practicability? The answer appears to us to be, that there is not a sufficient number of well-informed teachers to effect any extensive change. Indeed, it is among the instructors that improvement must begin, and this is the greatest difficulty which is to be encountered. The pupils themselves are manageable, and, as has been proved in many instances, take delight in whatever really and sensibly increases their stock of knowledge. Nor is it in want of actual information that the deficiency lies, but in a prejudice against all systems of which learning out of a book is not the essential part. As far as instructors are concerned, the department of education to which this article is devoted has suffered much, in common with the mathematics, from the practice which prevails among the heads of schools, of transferring all duties of instruction to subordinate ushers or masters, except those which concern the Latin and Greek languages. We have here a remnant of the system which prevailed some years ago, of teaching nothing except classical literature. When it was at last thought desirable to introduce something more into the routine of education, the new study was rarely pursued under the personal superintendence of the head of the school, and was therefore regarded by the pupils with indifference, if not with contempt. In some of our public schools, for example, the mathematics are yet on the same footing as the exercises of fencing or dancing, since, though tolerated and connived at, they are not the road to any distinction; and it is at the option of the pupil, or his friends, whether

they shall form any part of the pursuits of the former, or not. We are not aware that in any one is even this little degree of encouragement afforded to the study of natural philosophy; at any rate, the great majority of our endowed institutions, and, after their example, most private schools, do not afford the means of pursuing it, even to those students who might be desirous of gaining such knowledge in their leisure hours. This may be said in England without exciting much astonishment; but, according to the proverb, they manage these matters better in France. There, no considerable institution for the education of youth is unprovided with teachers on several subjects which are neglected among us, and particularly of natural philosophy. We should be glad to see this example followed; and, to produce the proper effect, it will be necessary that the heads of schools themselves should take an active part in both this and the mathematical department. We do not say that it is imperative upon those who are unqualified, to proceed immediately to the difficult task of acquiring, at a late period of life, knowledge so little akin to their former pursuits; but we do assert that it is their duty to show, by engaging the most competent assistants, and by showing that themselves are personally interested in the result, that the hitherto neglected branch of education is not merely tolerated, but really considered as a prominent and useful study. We do not, by any means, speak disrespectfully of the ancient languages, the necessity for which is proved by reasons of unanswerable force, when we assert that it is only the circumstances of the times, and unwillingness to advocate changes of too violent a nature, which prevent us from arguing that they should be considered only as secondary in im-

portance to the pursuit of the knowledge of nature, in the widest sense. But that it is almost hopeless to expect such a result, we should say that the acquisition of the elements of natural philosophy and natural history should divide the student's time equally with the *belles lettres*, and the Greek and Latin writers. This is unfortunately so far from being the case at present, that, though fully confident of the adoption of such a scheme, in process of time, we should now consider it as trifling with the reader to pursue the notion farther. One considerable point, however, will be gained, when natural philosophy, commonly so called, is recognized; and this finger will be the means of introducing the whole hand.

Had we written this only one year ago, we should have been at a loss where to find a book which would have won the intelligent by profound and rational views, the critic by beauties of style, and the follower of others' opinions by the authority of a distinguished name. No one, at all conversant with our present literature, can doubt that we refer to Sir John Herschel's "Preliminary Discourse on the Study of Natural Philosophy." Pre-eminent as this work will always appear, if only as an attempt to popularize the spirit of philosophic investigation, there is yet one omission, which, considering how important the subject is, and how well the author would have treated it, we must call a defect: we mean a chapter on the desirableness of introducing physics as a branch of education. But, for the instructor whose acquaintance is only with phenomena, and the catch-words by which they are explained; or the parent, who, with an ordinary education, is desirous of being instrumental in giving his children advantages which were denied to himself, we know of no work so well calcu-

lated to point out the path of real knowledge. We would not, by this assertion, lead our readers to conclude that they can, by the work above mentioned, obtain their object without thought or pains on their own part. Nothing but thought can give any value to the results of thought,—at least in any higher sense than that in which the maker of a telescope can be said to avail himself of the mind of Galileo or Newton. The man, however, who, to an ordinary knowledge of the results of scientific inquiries up to the present time, adds some power of reflection, and delights in the exercise of it, will here find the development of views which he might have searched for in vain in most other treatises, filled as they are with experiments and results, and not with the use which may arise from the study of the method of obtaining them. We will even go farther, and say, that this work will be better adapted even for children than most of those which are in their hands; though they will find much which they cannot understand, there is no small difference between obscurity which is worth explaining, and that which is not. And the mind of a young person would be forcibly impelled to know more of that which presents difficulties, from the very interesting nature of the illustrations with which the treatise abounds, and which are in most cases more intelligible than the examples given in works written expressly for their use. The whole is a splendid verification of what we have already asserted, that knowledge of the highest kind is never more urgently wanted, or more advantageously displayed, than in an attempt to illustrate the most elementary principles of any branch of knowledge.

The additions necessary to render this work a proper basis of school instruction are, a teacher who thoroughly

enters into its spirit, and a mass of facts in connexion with the different points on which it treats. The first, though a *rara avis*, is sometimes caught; and the second, though the collection of a sufficient number would be a work of much research, might be partially supplied by any one possessed of moderate information, to an extent which would considerably benefit his pupils. This being done, the "Discourse on the Study of Natural Philosophy" would form a class-book infinitely superior to those now in use, both in style and matter. If there be any who smile at our proposing a disquisition worthy the serious attention of the most learned as a study for the beginner, we would say, that an elementary work is of little value to the latter, unless it contain matter of interest for the former; and will refer them to the fact, that the first principles of every science are among the last to be clearly understood. Moreover, we do not assert that the work in question is complete in itself for the purposes of education; but we do not find in it any assertion, or any principle, which does not admit of such elucidation as would bring it within the comprehension of a child. Let us take, for example, the following paragraph, being the enunciation of the general method of classification,—page 102:—

"It is thus we perceive the high importance in physical science of just and accurate classification of particular facts, or individual objects, under general well-considered heads or points of agreement, (for which there are none better adapted than the simple phenomena themselves, into which they can be analysed in the first instance,) for by so doing each of such phenomena, or heads of classification, becomes not a particular, but a general fact; and when we have amassed a great store

of such *general facts*, they become the objects of another and a higher species of classification, and are themselves included in laws which, as they dispose of groups, not individuals, have a far superior degree of generality, till at length, by continuing the process, we arrive at *axioms* of the highest degree of generality of which science is capable. This process is what we mean by induction; and from what has been said, it appears that induction may be carried on in two different ways,—either by the simple juxtaposition and comparison of ascertained classes, and marking their agreements and disagreements, or by considering the individuals of a class, and casting about, as it were, to find in what particular they all agree, besides that which serves as their principle of classification."

If we had proposed that the pupil should learn this, as an answer to a question in a catechism, our absurdity, though considerable, would not be unparalleled, since, to compare great things with small, this would not be more unintelligible to a child, than the last of our quotations in p. 225: it is evident, however, that we have imagined no such thing. But if, on the other hand, the words were first properly explained, not out of a dictionary, but by actual example and illustration; if, again, to the instances given by the author others were added in considerable quantities, and such might be obtained, in any number, from among those objects with which the pupils are most familiar; if it were not regarded as material, whether so important a method were made the subject of one or of twenty lessons,—what is there in the development of this principle of which a clear conception could not be formed, or a good foundation of it laid, at almost any age? And, if such be the case, why

should sense be excluded because the language is difficult, when that difficulty may be removed; while nonsense, in language equally hard, is circulated and learned by rote without any attempt whatever to make it more easy? Undoubtedly the method of removing all objections would be to write a Discourse on the Study of Natural Philosophy which should be to the child what the one before us is to the man; but who is there to perform this task? It would require knowledge, and power of illustration, no ways inferior to that of the distinguished author of the "Discourse," combined with great experience in instruction. Nevertheless, that a work should exist, from which by any means so desirable an end may be gained as that which is proposed, is matter of congratulation for all who value knowledge as a source of civilization and happiness.

Although our remarks have been wholly confined to the study of natural philosophy, the same would apply, in some degree, to that of natural history. The present neglect of both will furnish a curious story for aftertimes. It will be on record, that among the first commercial people in the world, who depended for their political existence on trade and manufactures, there was not, generally speaking, in the education of their youth, one atom of information on the products of the earth, whether animal, vegetable, or mineral, nor any account of the principles, whether of mechanics or of chemistry, which, when applied to these products, constituted the distinction of their country. And this, when the studies so abandoned were allowed by all to be worthy of pursuit, simply as an exercise of the reason, and without any reference to their application. This story will one day excite some wonder, which will be removed

when it is added, that the tone of school education was given by certain endowed establishments, which, resting their existence upon the fame acquired when Latin and Greek were reputed the only useful branches of instruction, used their influence to exclude all others, long after the rational part of mankind had pronounced that more was necessary. Thus much we can assert without laying claim to the title of prophets; but it may be, and we would put it to those who direct the public schools whether it is not worth taking it into consideration, that their historian shall have to finish by saying, that while previously acquired reputation was supporting them in their quiescent obstruction of all improvement, a gradual change took place in the public mind on the subject of education, which they, occupied as they were in constructing elegant Greek and Latin verses, were among the last to perceive, that when, at a late period, they became willing to alter their system for the better, the time had past, and the recollections of former obstinacy rendered their demonstrations of improvement of no effect; that they sunk in estimation from that time, and finally became an object of interest to the antiquary only, for the remains of Gothic architecture which they left behind.

ON NATURAL HISTORY AS A BRANCH OF COMMON EDUCATION.

By CLEMENT DURGIN.

(From the American Discourses.)

The object of this lecture is to invite your attention to the subject of Natural History, and to urge its claims to be introduced as a branch of common education. In discharging my duty on this occasion, it will not be expected that I should treat the subject as if it were new to the members of this Institute. It gives me pleasure to believe that I am addressing those who duly appreciate the importance of this study, and who are disposed to give an indulgent consideration to the expediency of adding it to the branches already taught in common schools. Whatever shall dignify the profession of a teacher by the importance of his instruction, or promote his usefulness by enabling him to extend his labours to those subjects which are calculated to give him an honourable rank in society, I feel assured will meet with your respectful attention.

In stating some of the reasons why natural History should receive the particular attention of schools, and in sketching a few of the outlines of the study, and the advantages to be derived from it, I shall omit those minute details, upon which, more particularly, depend its charm and intrinsic value.

Free schools are among the most valuable of civil

institutions, and should be ever under the watchful eye and guardian care of every friend of virtue and civil liberty; and so far as this association can extend its influence or lend its aid, it ought to see that the republic of letters receive no harm. It is certainly a noble purpose of this Institute to discover and apply the best methods of teaching the various branches of education; and I speak with due deference when I say a higher motive does not exist; the attention of man cannot be awakened to a more important object than that of making himself and others happier, by understanding and teaching the principles of truth and duty. What then is the education which we should promote? In its most extensive acceptation, it comprehends whatever may have any good influence in developing the mind, by giving direction to thought or bias to motives of action. To lead infancy in the path of duty, to give direction to an immortal spirit, and teach it to aspire by well-doing to the rewards of virtue, is the first step of instruction. To youth, education imparts that knowledge whose ways are usefulness and honour, and by due restraint and subordination, makes individual to intwine with public good in a just observance of laws comprehending the path of duty. To manhood, "it leads him to reflect on the ties that unite him with friends, with kindred, and with the great family of mankind, and makes his bosom glow with social tenderness; it confirms the emotions of sympathy into habitual benevolence, imparts to him the elating delight of rejoicing with those who rejoice, and if his means are not always adequate to the suggestions of his charity, soothes him at least with the melancholy pleasure of weeping with those who weep?" To age it gives consolation, by

remembrance of the past and anticipation of the future. Wisdom is drawn from experience, to give constancy to virtue; and amidst all the vicissitudes of life, it enables him to repose unshaken confidence in that goodness, which, by the arrangement of the universe, constantly incites him to perpetual progress in excellence and felicity. Education is the growth and improvement of the mind. *Its great object is immediate or prospective happiness.* That then is the best education which secures to the individual and to the world the greatest amount of permanent happiness; and that the best system which most effectually accomplishes this grand design. How far this is accomplished by the present system of education is not easily determined; but that it fails in many important considerations cannot admit of a doubt.

It is feared, that, by a great majority, a wrong estimate is made of education. It is not generally considered as a *means* which must be employed to accomplish *some other purpose*, and consequently made subservient and secondary to the employments of life? Is it not considered as being contained in books, and a certain routine of studies, which, when gone through with, is believed to be accomplished, and consequently laid by, to be used as interest may suggest or circumstances demand? *Education comprehends all the improvements of the mind, from the cradle to the grave.* Every man is what education has made him, whether he has drunk deep at the Pierian spring, or sipped at the humblest fountain. The philosopher, whose comprehensive mind can scan the universe, and read and interpret the phenomena of nature; whose heaven-aspiring spirit can soar beyond the boundaries of time, indulge

in the anticipation of immortality, and discern in the past, the present, and the future, the all-pervading spirit of benevolence, is equally the child of education with him whose soul proud science never taught to feel its wants, and know how little may be known. If it is education, then, whose power metes out condition, and happiness or misery, what profession should rank so honourably as that which controls and directs it; and upon whom rest such high responsibilities as upon those who are intrusted with the charge of forming the human mind!

It is often a cause of deep regret that education answers so imperfectly its design; and I believe that all experienced teachers will concur with me, that much of our labour is apparently thrown away; that much of our exertion is baffled and counteracted by circumstances beyond our control: and it is very problematical whether all the means and pliances of this inventive generation shall add much to the permanent advancement of mental cultivation.

The experience of centuries is before us upon the important subject of education, and yet no age perhaps has exhibited such excitement, change, and experiment as this. These are good indications, as they exhibit the exertions of an immortal nature, striving to discover and apply a greater good than has yet been spread over the face of society; but it is no less important to know when to rest satisfied with experiment, and to learn how best may be applied the materials already at our command. It may be well for those whose duty it is to investigate the cause of our grievance to examine with a scrutinizing suspicion into many of the boasted improvements of the day; to see if there is not more show than

substance. Should it be discovered that many of the facilities for teaching are but *troublesome conveniences*, and that many books now in use are so far simplified as to be destitute of nutrition, a remedy can easily be suggested. It may be, that hereafter it will be ascertained that nature never intended a child should learn to walk on crutches, or think by a machine. This age stands pre-eminent for the application of power to the movement of locomotive engines; and in its all comprehensive sphere this power kindly lends its aid to propel the mental energies, saving to the community an immense amount of painful labour and hard thinking; and so vivid is the prospect in the vision of some romantic pioneers, that their advancement before their less zealous brethren already enables them to descry a railroad cut to the highest pinnacle of the hill of science, along whose flower-strown path the velvet cushion of a steam-carriage shall bear the sons and daughters of literary distinction, with an ease and rapidity truly astonishing. It is ardently expected that it will soon be as easy to acquire eminence in this country as it is to inherit it in any part of Europe.

It is not for me to predict what will be the result of such sanguine expectations. I acknowledge no man my superior in ardent wishes for improvement in systems of education; but if I may be permitted to give an opinion, I would say, that whatever shall attempt to relieve the mind from labour necessary to its growth, or by explanation and illustration to supersede the necessity of vigorous thought and diligent application, must be injurious to the cause of sound learning, and can foretoken nothing more inviting than a barren intellect and an empty brain.

A part of the evils under which education at present labours is undoubtedly attributable to the system itself. It is often a subject of remark, that so little of school education is carried into the actual business of life; that what was considered dry and uninteresting at school, is soon forgotten after the pupil is disengaged from the thraldom of early years, and takes his place in the community, where his own powers of mind are, for the first time, brought into exercise. Nor is this a source of wonder. I ask any instructor to call to mind the present routine of common education, and tell me how much of it is calculated to develop the mind. We will not enter upon the disputed point whether all ideas, or the elements of knowledge, are implanted in the mind through the medium of the senses acting upon external objects, or whether they are innate in the mind, and evolved or brought out by the exercises of the senses. One thing appears to be certain: we were born with certain instincts and feelings, which are the result of our organization, and we are endowed with the powers of perception and memory; and from these must proceed all our knowledge. But we would inquire how much of present instruction is made to retain its influence in after life. Are we told that we have only time to learn what is absolutely useful to enable us to discharge our several duties, and that all knowledge which cannot be brought to aid us in our daily labours to obtain a livelihood is useless, its acquisition is time misspent? We cannot envy such a one the pleasure of so humble an estimate of the human mind or the value of education. It is true we have only time to learn and practise what is useful. What then is useful knowledge? What should be taught? That is useful knowledge

which makes us wiser and better—that should be taught and practised which will secure the greatest amount of permanent happiness. By the condition of our being, it becomes necessary to learn first what may contribute to our immediate wants; but our wants are always immediate. To say we should teach what ought to be practised in after-life conveys a complete idea of the term education.

The usual branches of a common education are taught for their indispensable utility. We make complaint of the amount of knowledge acquired, and the want of thoroughness; and when it is remembered that a part or all of the first twelve or fourteen years of life is spent at school, it must be confessed that less is accomplished than might reasonably be expected. In this time a small capital of ideas ought to be accumulated, to enable the individual to live without becoming entirely dependent on others; at least, he ought to be enabled to understand what shall be of daily occurrence to him. It is the unfortunate lot of a great majority of mankind to be obliged to labour for the means of existence. They consequently have little time for study; they acquire ideas slowly from books, and trust to the passing events of the day for the topics of thought and conversation. A vast amount of useless thought is thus expended on low and trivial subjects; and social intercourse, which might be made subservient to the noblest purposes of our being, improvement and happiness, is too often degraded by folly or poisoned by intemperance. But what shall prevent the mind's abasement? At that interesting age when the intellect begins to assume its manly features, and needs, more than ever, something to nourish and direct it, the feeble stock of early

acquisition is insufficient to its support, and the character then becomes the child of accident and the sport of chance. There is evidently too little in common education for which in after-life memory will pay her tribute to early instruction.

To obviate this misfortune, it is proposed to interpret to youth the rudiments of that great book, the works of nature; to enable them to read and understand the ceaseless wonders and boundless perfections there displayed. It is not desirable that the study of natural history should be introduced to the exclusion of any branch of common education now taught; all that is desirable is, that it be permitted to take its appropriate rank, and receive its merited attention. The natural sciences are neglected, to the great injury of mankind in what most intimately concerns them, their happiness. Happiness, it should be remembered, is not only the great object of education, but of life itself. Whatever augments this is the soul's great good; not that effervescence of feeling which agitates a giddy mind, and, like the mist of the morning, is soon to pass away, and leave behind its damp and chillness; but an inwoven, deeply-rooted enjoyment, rising from the fountains where reason and philosophy, nature and art, combine and mingle all their sweets. In that hard doom which bound man to daily toil for his subsistence on the hostile earth, we behold the tokens of mercy, that by the constitution of his nature, he is enabled to convert all the objects around him into sources of pleasure. It is this capacity to see and enjoy beauties in the works of creation that we would cultivate, making all things answer the double purpose of supplying our wants and administering to our enjoyment.

Contemplate for a moment the condition of a human being, and the means ordained for his existence. His feeble frame is invigorated by the life-giving air; his eyes brighten to look upon and enjoy a pleasant world, and his ears learn to distinguish the varieties of sound. Nature has placed him in a world of organized things, all of which lend their influence to develop his immortal spirit. His senses were given him to be the ministers of thought and feeling between the world within and the world without. It is the office of education to regulate this influence, to determine whether this child shall be the gloomy savage or the enlightened philosopher.

It has never entered the imagination of man to conceive of the amount of rational enjoyment there is in the storehouse of nature, unless he has enlisted his feelings in her cause. Books may be read and be forgotten. The avocations of after-life may leave us no time for their perusal, but the volume of nature is always open before us; in every walk, in every scene of duty, its voice may be heard to instruct and delight us. Escape her influence you cannot. "It raineth on the just and the unjust." The vegetable kingdom in its verdant beauties, the insect tribes with all their varying wonders, the birds, that luxury of nature, and all the animals that people earth and sea, are, to the natural philosopher, objects of interest. He can see design and perfection in the insect that sometimes annoys him; in the bird that sings, or preys upon its brother; and in the animals that administer to his support, or plunder his subsistence; even in the inanimate earth he finds the materials of happiness; and, when he has hewn his granite tomb, it adds one consolation to his common allotment, to reflect, that, while his spirit shall dwell

with the First Cause, his dust reposes in the first monument of earth's existence.

Natural history, in its full extent, embraces the name and description of every object of the material world, together with their changes and phenomena. Although every part of nature is interesting, it cannot be expected that a familiar acquaintance with all can be the favoured lot of many. Life, exclusively devoted to this study, would fail to comprehend it; and after the genius of ages has lent its light to discover and record the wonders of creation, much remains for future industry to accomplish. It is not, however, in the hope of adding anything new to the long catalogue of natural objects that I now urge its claims to the attention of the teacher; it is indeed hoped that discovery has not yet furled her wings for ever, but that sons and daughters are to be born to science in this favoured land; I would not, however, urge further conquest; I only ask for the cultivation of what we already possess. The extent of natural history might be considered as an insurmountable difficulty to its introduction as a branch of common education. If you look at it in books it is indeed forbidding. Its long catalogue of names is so appalling that few have the courage to attack, and still fewer the good fortune to conquer. Yet these are no objections to it as a study, much less to its value or expediency.

The object of common instruction is to impart important and general ideas; to explain the principles upon which knowledge is founded, as landmarks to guide the pupil in the onward path of life. However much it is to be regretted that the great mass of mankind receive but a scanty education, considering the circumstances

under which they live, it is no reason why the fountains of knowledge should be locked up, lest

"Shallow draughts intoxicate the brain."

Knowledge, however little, is valuable, provided it be useful, and made subservient to life, and life's great aim. In the time usually devoted to common education, nothing more is attempted than the simple rudiments of the branches taught; so in natural history, we can expect only to introduce the pupil into that sublime temple, paved with gems, decorated and perfumed with flowers, and made radiant with life and animation.

On this extensive subject I am permitted to speak of but few of its prominent features. In teaching, I would begin where nature intended, at home, and explain the objects immediately around us. In this department, books for the pupil, and scientific arrangement, with the teacher are minor considerations. The object is to teach a knowledge of *things* rather than of *words;* to study nature in her own livery, rather than in the drapery of art.

In Mineralogy, the names and uses of the different substances are easily remembered by the pupil, and as they are always before him, an acquaintance with them opens an extensive field of rational enjoyment, which will fill with pleasure many a vacant hour in after-life. One of the most obvious advantages arising from the study of the natural sciences is the habit of discrimination which it teaches. To learn to distinguish, by a careful comparison, the less obvious differences in specimens apparently the same; to comprehend at a glance the distinguishing features of others; to observe the various and beautifully formed crystals, and to remember the different purposes to which the minerals are appro-

priated in the arts and economy of life, all combine to give that power of discrimination which constitutes, to a very considerable extent, mental superiority. Another advantage of great importance, derived from this study, is, that it can be understood by the pupil. I wish I could with equal truth bestow this high encomium upon all the subjects now employed to develop the youthful mind. Nature's teachings are always simple, though sometimes sublime; and the child, who has been led to admire the sparkling gems found upon the surface of the earth, may, at a riper age, be taught to comprehend the more sublime features of nature which modern Geology has revealed. In the composition and structure of the earth there is a grandeur displayed that almost mocks the creative imagination. The extensive vale, with its rich, luxuriant mould; the rocky hill, shorn of its verdant glories; and the towering mountains,

> "Whose vast walls
> Have pinnacled in clouds their snowy scalps,
> And throned eternity in icy halls
> Of cold sublimity,"—

are the displays of that power whose agents have broken down the solid barriers of earth, and scattered the surface with their fragments—have scooped out the beds of lakes and rivers, and in sand and stone marked the boundaries of seas and oceans. In the effects of earthquakes and volcanoes we catch a glimpse of the hidden energies of nature; and in each recording stratum of earth's progressive state, we read the memorials of other times and other beings, when the deep foundations were broken up, and in oblivion were buried the countless races of former ages, whose fossil relics are all that now remain to tell of their existence or the catastrophe which overwhelmed them.

The science of Chemistry cannot be too strongly recommended as a branch of common education, as it is more immediately connected with our welfare and happiness than most other subjects. It acquaints us with the nature of the material world, the influences of different substances upon each other and upon ourselves, and unfolds the great laws of nature, by which the ceaseless changes of organization and decomposition are effected.

The knowledge derived from the natural sciences is not confined to the objects of nature, but it sheds its light on every other department of learning. Chemistry teaches, that changes, by combustion or decomposition, are not a loss of matter, but a different state of being. It coincides with revelation in proclaiming the immortality of the soul, in the attested fact, that nothing can be annihilated ; while to Geology is reserved the honour of confirming, from nature, the doctrine of miracles. Geology declares that this earth was long inhabited by countless races of animals before it became the abode of man. Comparative Anatomy establishes the fact that man could not have ascended, by gradual improvement, from any other race of animals. His introduction into this world must then have required an absolute creation ; and this was a miracle, an event which the established laws of nature could not have accomplished. If the doctrine be proved in one instance, it will obtain in all.

Living as we do amidst the wonders of creation, where all seem to subsist by a miraculous power, nothing delights us more than the various aspects which the ceaseless changes of the year produce. In spring, after having escaped the long confinement of winter,

with what delight do we hail each springing blade or opening flower; our hearts expand with the vernal blossom, and our feelings awake to livelier emotions, as we behold the daily progress of vegetation dressing the landscape in smiles and loveliness. Among all created beings, it is alone the high prerogative of man to comprehend and enjoy the works of nature. The influence arising from rural scenes is kindly calculated to elevate and refine our feelings, and to impart that sweet and amiable disposition which is at once the most valuable and endearing accomplishment of our nature. As "an undevout astronomer is mad," so an unamiable lover of nature is an unnatural monster.

"All natural objects have
An echo in the heart. This flesh doth thrill,
And has connexion by some unseen chain
With its original source and kindred substance.
The mighty forest, the proud tides of ocean,
Sky-clearing hills, and, in the vast of air,
The starry constellations, and the sun,
Parent of life exhaustless—these maintain
With the mysterious and breathing mould
A coexistence and community."

Perhaps no part of nature offers more pleasing attractions than the vegetable kingdom. The study of botany is eminently calculated to awaken genius, to correct the taste, and to give a glow and richness to the imagination. It is certainly to be lamented that this useful and highly ornamental branch of knowledge is so much neglected. Whether this arises from the apparent difficulties in the science, or the imperfect mode of teaching it, cannot be easily determined; certain it is, that it is worthy the attention of all rational beings, who hope to spend a life of happiness amidst the budding glories of spring, the ripening summer, and the bounties of the autumnal year.

In teaching this subject to children little dependence

should be placed on books; the hard names there employed will tend to wean rather than to engage the attention. Familiar lectures upon the objects themselves combine most of the advantages desirable, and if a judicious management be preserved, the pupil will soon find himself possessed of those leading facts which will enable him to understand the changes and interpret the phenomena of the vegetable kingdom. A strict attention to method and scientific arrangement cannot be too urgently recommended to those who wish to become proficient in the study; but care should be had that too much be not undertaken in the case now under consideration. It must be remembered that, of the time devoted to a common education, very little can be given to the study of nature; that little should be given to nature herself, and to nature at home. The study of rare and curious plants, exotics, is indeed pleasant to those who have leisure; but our object now is to make the pupil acquainted with that part of the vegetable kingdom immediately around him, amidst which he is probably destined to spend his life: not to teach him the beauties of the tropical regions, and leave him ignorant of those of his home. Instances are not uncommon, where individuals can repeat all the names of green-house plants, but know not the name or nature of those that spring up by their daily path, and which, if far brought, would be considered equally beautiful with their more favoured sisters. This disposition to exile the mind from home is among the leading propensities of our nature. We send our thoughts and sympathies abroad, and expend them on useless subjects, when they should be employed at home; nor is this peculiar to one subject; instances are too frequent

where men can read Latin and Greek fluently and correctly, who can neither spell, write, nor read their native tongue accurately.

Among the most interesting parts of plants are flowers. Their endless varieties of form, colour, and odours never fail to excite our admiration of that wonderful display of infinite perfection exhibited in their matchless hues and inimitable structure. He who hath no love of flowers in his soul,

"Is fit for treasons, stratagems, and spoils."

The vacant moments of life are often beguiled of their pains by these emblems of purity and innocence. They please us by their beauty, they please us by their fragrance—even their evanescence pleases us, and we hail their return with a joy which would be unknown were they the abiding objects of creation. The pleasure derived from flowers is greatly enhanced by a knowledge of their parts, and the important functions they perform in the economy of nature; the instructed eye will perceive beauties which must remain hidden to the untaught vision.

A few general ideas will comprehend the folious system of plants, in which may be found much useful information—such as the general structure of the leaves, and the purposes which they answer in the growth of the vegetable—that by them the sap is elaborated, in the same manner as the blood in the lungs of animals, by the absorption and decomposition of air—the means employed by nature to renew them the following year, by buds in the temperate and cold regions, but by another process in the torrid zone. Vegetable physiology, including the structure and growth of plants, is itself an exceedingly interesting subject, easily taught and comprehended.

One of the noblest occupations which engages the active powers of man is agriculture. As it is the support of all others, so should it rank first in point of dignity. Its claims to superiority over manufactures and commerce demand that the man should not sink below his profession. As a large proportion of those who receive a common education will become tillers of the earth, we know of no way in which they could be more efficiently benefited, than by teaching them a knowledge of the soils and their productions, amidst which they are to employ their labour and spend their days. Of scientific agriculture our country has much to learn before the husbandman can reap the full reward of his exertions. Horticulture is beginning to strew its flowers and fruits along the path of healthful industry, giving fragrance and richness to the beauties of nature. It is ardently hoped that an improvement in education will do something to free agriculture from its abasement, caused by the habits, prejudices, and want of information in too many of its worthy followers.

It is an old saying that nothing was made in vain; yet what a vast number of living creatures there are, as well as of plants, of whose importance or connexion in the economy of nature we are ignorant. How much yet remains to be accomplished before man can become the interpreter of nature, to which his rank entitles him, and which his improvement demands.

The condition of our being makes it incumbent upon us to understand the nature of that system of things of which we form a part, and from which we derive our subsistence. To know ourselves would comprehend a knowledge of almost everything else; but no knowledge is more interesting or more useful than that which

is derived from the study of nature. Our existence is as intimately connected with the elements around us, as is that of a plant; and it is pleasing to know how we live and move. This inquiry would show us the importance of the study now under consideration. How intimately connected is the continuance of life with air and heat; and these alone, in their various phenomena, open a wide field for observation. From the earth we draw most of the solid materials which enable us to hold dominion over nature. A knowledge of these, and their application, inwoven as they are into every department of civilized society, is no less useful than interesting. We derive our food from the earth; but are unable to subsist upon its crude materials. Established then between us and the fountain of our existence is the great laboratory of animal life, the vegetable kingdom, which opens to us a field of boundless extent and variety. From the vegetable kingdom we derive much of our food and clothing. It furnishes the softer materials for building our houses and machines, and enables us to construct the noble ship, and navigate it to all parts of the earth, thereby extending the boundaries of commerce and civilization, giving to the less the luxuries of the more favoured climes, and making the nations of the earth one great community. Our interest, our welfare, and our happiness, all combine to invite and urge us to study this delightful part of creation.

A stronger claim, arising from sympathy, is urged upon our attention by the countless races of animals which people the air, the earth, and the ocean. In viewing the forms and habits of animals, we are led to bestow on them a certain capacity or intellect, some traits of which are exhibited by them in a wonderful

degree. We imagine them susceptible of pleasure and pain, and endowed with the nobler qualities of our nature, such as love, courage, and gratitude. These, together with the multiplied relations which animals hold in the grand economy of nature among themselves, and to us, always come home with a pleasing interest to all minds in all ages. No study is better calculated to unite the twofold purpose of amusement and instruction than this. What an immense number of human beings are supported on the flesh of animals. Millions are daily sacrificed for food and clothing. Almost every animal is taken for food in some parts of the earth; while feathers, fur, wool, silk, and skins, are converted into articles of dress. Oil, spermaceti, wax, tallow, afford us light; and bone, ivory, pearl, shell, horn, whalebone, hair, bristles, are all made to administer to our wealth and happiness. This fact that animals supply our wants to such an extent ought to excite our interest in their history. The favourite mistress of the Indian hunter is robed in less spoils of animals than the votary of taste and fashion in refined society. The ox and the kid have yielded up their lives to furnish their skins for a lady's shoes. The whale sent its oil from the arctic regions to dress the leather, and the swine lent its lard and bristles, and the bee its wax, to assist in the manufactory. For her dress, silkworms in multitudes have toiled and died. The sheep silently relinquished her fleece to form the outer robe, on whose borders the marten, the otter, the ermine, or the sable, holds a conspicuous place. From the ears are suspended, curiously wrought, the mother-of-pearl brought from the depths of the tropical seas; the turtle has been robbed of its shell, and the cow of her horns, to be

transferred as ornaments to the lady's head; while the rich plume of feathers and the ivory fan show us that the ostrich and the elephant have not escaped this general destruction. The representatives of twenty different animals, from the four quarters of the globe, frequently unite in a lady's wardrobe. In some instances, whole tribes of men subsist almost entirely on a few species of animals. The Esquimaux and the Laplanders turn the reindeer to a better account than Boniface did his ale. They not only eat and drink and sleep upon this useful animal, but convert it into many other purposes in their simple economy.

Some of the domestic quadrupeds are the faithful companions of man in every part of the globe, rewarding his care and protection by their clothing, their milk, and their flesh. It is interesting to learn the changes which all domestic creatures undergo by cultivation; and, in an agricultural point of view, this knowledge is highly useful. Some scientific knowledge of animals, their form, structure, disposition, and modes of living, should be regarded as a valuable portion of every education. The number of objects in Natural History seem to point it out as the appropriate field for the development of the young intellect. It suits well the restless disposition of childhood, when no one object pleases for a long time; and, unlike most other subjects, this retains its interest in after life: he who loves a flower in youth will love it when he is old. The taste for nature must be planted early in life, to enable its possessor to enjoy a ripened harvest.

Every thing which the Deity has created is worthy of our attention.

> "Nature has nothing made so base, but can
> Read some instruction to the wisest man."

The subject of Entomology, or the history of insects, is less understood in this country than that of any other department of natural science. This arises, perhaps, either from the circumstance that the knowledge of insects is obtained at a great expense of patient industry and acute discrimination, or from a want of taste, arising from a want of information in this most interesting department of animated nature. It is true that few studies demand a more untiring devotion than that of entomology; and it is also true that there is little in it which can be turned to a cash account; reasons sufficiently powerful to induce many individuals to keep at a respectful distance, and perhaps, as is usual in such cases, to put on their contempt to hide their ignorance.

The wonders of creative wisdom are no where more strikingly displayed than in the insect tribes. Every part of matter amidst which we live and move, swarms with myriads of beings, countless and various as the leaves of the forest, assuming every colour that beauty could suggest, every form that the imagination can conceive, and, in perfection of powers and adaptation of parts to the circumstances of their existence, equalled by no other part of the animal kingdom. Numerous and various as they are, minute as are their bodies, and transitory as is their existence, they are nevertheless bound by certain laws of their natures, which are readily perceived and explained. With no part of this living world are we more intimately connected than with the subjects of entomology. Some, as the bee and silkworm, administer to our wants and enjoyments; others, whose design is less obvious to us, answer undoubtedly equally important purposes in the great economy of nature. The happy myriads that gambol in a summer's

sun; the worm that gnaws at the root of our vegetable, that strips our fruit trees of their leafy glories, or that spins our costly garments; the blights of spring, and the locusts of autumn, spreading dismay and famine; and the coral insect, building its habitation mountain high from the fathomless depths of the ocean, to become the destruction of commerce, or the foundations of islands rich in oriental productions, are all objects of interest to a contemplative mind.

Some of the general facts connected with this subject, and which will always be found useful and interesting, are such as relate to the origin and formation of insects; that most of them are oviparous, but some are both oviparous and viviparous—that they pass through several stages of being, assuming different forms and subsisting upon different kinds of food — that their structure and organization is peculiar to themselves—their mode of respiration differing from other creatures, the air being admitted to a complicated circulation through the system by means of spiracles and tubes on various parts of the body, but never on the head—no insect breathing through the mouth,—and consequently they produce all their various sounds by their wings, legs, and other parts of the body. The changes which most insects undergo in their transformation from the vile worm to the gay wanderer from flower to flower are curious in the extreme. At first, we behold an atom, which on being exposed to the genial warmth bursts its shell and exhibits the feeble insect, capable of procuring its own food, amidst which, by the instinct of its mother, it has been placed. In its larva state, it repeatedly casts its skin, until, arrived at its full growth, it ceases to eat, selects some place secure from danger,

spins itself a shroud, and, in a temporary death, a vivid emblem of mortality, awaits its final consummation of being, when it emerges from its tomb, and, changed in every organ, feature, and capacity, rises into a higher state of existence, to fulfil the important purposes of its creation.

No subject is more fruitful of moral instruction than this:—

> "Who can observe the bee and ant,
> And not provide for future want?"

The admonitions to duty and perseverance, the example for self-devotion to each other's welfare, rise at every stage of investigation into the habits of economy of these little creatures. Every department of creation is full of interest; in all we see enough to admire, but we do no injustice by the comparison, in saying that no part of animated nature presents so much to feast our wonder and astonishment as this. The habits and labours of the bee have been admired in all ages; their industry and economy in the construction of their inimitable habitations—the mathematical exactness in which the cells are proportioned—the division of labour at home and abroad—the collecting of honey and pollen—the care and attention to the young—the massacre of the drones, and the important functions of the queen, with the mysterious influence which her presence exerts over her loyal subjects, are among the displays of that faculty which may be called animal reason, and which sometimes mocks at the boasted power of the human intellect, by a forecast and perception unattainable by the wisdom and philosophy of man. A taste for the cultivation of the bee would add much to the numerous charms of our delightful country. Their history is a volume of

useful instruction, and only needs to be known to be duly appreciated. The ant, though a useless insect, compared with the bee, is in its history no less interesting and wonderful. The policy and labours of ants, their extensive habitations in the tropical regions, and the remarkable fact, that they keep vast numbers of aphides in a kind of domestic subjection, to furnish them with honey, guarded by them in summer, and protected in their cells during winter, give the air of romance to their history, and raise our admiration of that Power whose works are as perfect in an atom as in a globe. Design is no where more distinctly manifest than in the foot of a fly, which enables the insect by suction to walk in perpendicular and pendulous postures; or in the glow-worm, whose shining light discovers her presence to her winged mate, herself being destitute of the means of flight. A limited knowledge of insects may often give pleasure to a summer ramble, and enliven many a lonely hour of pain and weariness. Although the objects of entomology are insignificant when compared with the nobler races of animals, which more immediately affect our interest, yet of every one who delights to trace the designs of intelligence in creation, and understand and enjoy the world around him, this study will command the few moments in the intervals of life necessary to obtain its leading features.

One of the most obvious beauties of natural history is the great variety in form and features everywhere presented to us,—an endless variety, arising from the combination of a few simple principles, readily perceived and comprehended. Take for example the oxygen of the atmosphere as a supporter of life, without which no plant or animal can exist. In its applica-

tion, how various are the means employed by nature, over all whose works, from the least to the greatest, an equal care is extended. In all warm-blooded animals the air is received into the lungs, where it parts with its vital principle to renovate the blood and give health and vigour to the system. In reptiles a different modification of the lungs and the circulating system produces a corresponding difference in the temperature of the body and the habits of the animal, enabling some of them to exist in a torpid state several months without eating or breathing. In fishes we discover another arrangement, that of gills, so constructed as to absorb the oxygen from the water in its passage through them; and in many of the lower orders of aquatic animals, the surfaces of their bodies, like the leaves of plants, appear to perform this important function; while in insects, as has been observed, the air is circulated by means of numerous tubes, interlacing the whole system, and communicating with openings in various parts of the body.

In the vegetable kingdom how simple are the elements which compose the endless variety there displayed. Oxygen, carbon, and hydrogen are the simple substances, which, modified by the law and directed by the influence of vegetable life, perform the ceaseless changes in form, colour, and consistence in the growth, decomposition, and renovation of this important part of creation. These elements accumulate and rise into magnificence and beauty, to fill nature's storehouse with riches and plenty; then again are scattered, to re-combine in different proportions in other substances, and thus preserve the harmony and order of nature.

These general ideas are easily taught, and not soon forgotten.

What has been said of the advantage derived from the study of the names, habits, and structures of the inferior objects of creation will also be applicable to the higher races of animals, with the addition, that our feelings become enlivened as our interest is influenced. The great variety of animals inhabiting the water will be found to possess a peculiar interest, arising from their adaptation to the element in which they reside. The ocean is the great abode of animal existence, and the provision made for the support of the various tribes, and the means employed to keep in check the more prolific species, are among the most obvious displays of Infinite Wisdom. For most of the animals, great and small, inhabiting the land, a common food is provided in the vegetable kingdom; comparatively few species prey upon others. But in the ocean it is different; from the small animalcula, to which a drop of water is a sea, to the mighty whale,

> "Whom God of all his works
> Created hugest that swim the ocean stream,"

the condition of the being seems to be to feed upon and in turn become food to others. The monsters of the deep are interesting to us from many considerations; their gigantic forms, the enterprise and danger of their capture, and the various uses to which they are appropriated in the arts and domestic life, render their history pleasing. The same is true of the smaller inhabitants of that element. The herring visits us annually from its home within the arctic circle; the shad and salmon

perform their yearly pilgrimage to the highlands of the country, in obedience to the dictates of their nature; and in every individual species something may be observed which will amuse and instruct.

Amid the profusion of living creatures that surround us, none bring to us livelier sensations than birds; their peculiar form, beautiful plumage, and graceful motion through the air, always delight us. They seem to be the ornamental part of animated nature, as flowers are in the vegetable kingdom. Winter spreads a gloom over the face of the landscape, which in summer was adorned in glittering splendour; and we feel the cold desolation as we survey the silent relics of the departed year; but when spring returns our feelings are enlivened to hear the winged heralds of seed-time and flowers returned from the sunny vales of the south, bringing the same sweet notes that so often charmed our infancy and, if the heart has kept its purity, still touches the sympathetic chord in the breast of manhood. In spring they give an additional enchantment to the smiles of infant nature; throughout the summer they delight and amuse us with sportive animation in their exuberance of joy and hilarity.

Ornithology has long been the favourite study of the naturalist, and perhaps no contemplation of nature is better calculated to impart kind and amiable qualities to the mind. From the golden-dotted humming-bird, smaller than many insects, to the rapacious condor of the Andes, whose wings extend through sixteen feet—from the humble denizen of the hedge-row or the cottage-roof, to the birds of paradise, beautiful,

> "As if dropped from some higher sphere,
> To tell us of the gorgeous splendour there;"

and each intermediate grade in colour, form, and modes of living, all open a storehouse of rational enjoyment which we can obtain nowhere else. The names and characters of birds are easily learned, but these alone are not the most valuable part of this subject. The grand object of the study of Natural History is to *enjoy*, in elevated and refined feeling, the works of creation; to look upon all things with that calm complacency which arises from an habitual contemplation of rural objects.

In the structure of birds, differing from all other creatures—in the circulation of air, not only in the lungs, but through the bones and feathers, for the purpose of making them lighter—in their food and habits of living—in the architecture of their dwelling, their eggs, and the parental care and attention for the young, we find abundant matter to amuse a young or instruct a riper age.

As we ascend to the highest class of animals, the mammalia, we find new wonders open to us in their more complicated forms and diversity of powers. In this extensive class are included most of the large and small quadrupeds inhabiting the land, together with the cetaceæ of the ocean, comprising the various kinds of whales, walrusses, seals, &c. Consequently the field of observation is as extensive and broad as the earth; but those varieties which immediately surround us are comparatively few, and their history easily acquired.

Animal physiology is a fruitful source of useful instruction, and should by no means escape the attention of the teacher or pupil. Digestion, the circulation of the blood, respiration, the wonderful mechanism of the eye and the ear, are among the most useful items of

general information, and may always be brought with an enlivening interest into the monotonous routine of daily teaching.

Natural History would be entitled to our veneration, if it taught us only the general outlines of our own system. It is certainly to be lamented that ignorance and prejudice should have so long triumphed over reason, in forbidding that most useful of all information, the anatomy and physiology of our own system. How few there are who understand their own organization, or know in what manner the human system is influenced by climate, food, and apparel, which would enable them to take the precautionary measures to guard against accident or disease. It can be easily and successfully taught in any school, even without drawings or preparations; and childhood might soon be divested of its timidity, if judicious teachers were permitted, by public opinion, to treat this subject in a manner worthy of human beings. Some attention to the leading features of anatomy and physiology cannot be too urgently recommended to all who have assigned to them the important duty of directing the education of youth. Important are the advantages arising from even a limited knowledge of our bodies, so fearfully and wonderfully made. Time will not now permit me to enumerate these advantages, though the injudicious treatment of children, the intemperate habits in eating and drinking, and the injurious fashions of dress, which would be most signally benefited by this knowledge, call aloud on me to advocate the cause of philosophy, reason, and humanity.

In attempting to introduce the study of Natural History into schools, the first duty belongs to teachers

themselves. To what extent teachers are generally qualified to instruct in the various branches of this science is unknown to me; but it would not be surprising if it were found that many had overlooked this, in qualifying themselves for the duties of their stations. Such owe it to themselves and their pupils to combine industry with perseverance, until the desired object be obtained. One half a day in each week could not be better spent by a school than in collecting and examining specimens of natural objects. This would tend very much to enliven the duties of teacher and pupil, and be productive of much good, besides the knowledge gained. The teacher should improve all occasions, when any rare and curious object is thrown in his way: the instruction of a few moments, spent in calling the attention of a school to such objects, at any time, will be remembered when hard-studied lessons shall be forgotten. Natural History owes more to Linnæus than to any other individual; and he attributed his early bias and love for the study of nature to the remarks his father made upon a flower, in a ramble, when he was scarce four years old. This botanical lecture, he observed, formed an epoch in his scientific life.

We would not exalt the study of Natural History at the expense of any other; we only wish it to occupy its appropriate place in education. What is life, but a school, where men and animals and things are the subjects of daily study!*

* "Natural History is very little estimated as it ought to be. Three considerations recommend it as a most important branch of study for boys and youths, in the school and academy.

1. I regard Natural History, when judiciously and faithfully taught, as one of the best preservatives against irreligion. Young people enter into life, in ninety-nine cases out of one hundred,

In our country, where freedom of speech is uncontrolled, there is a want of something to engage the attention, and draw it off from those subjects of feverish excitement, which spread with such scorching influence in these days of modern reform. The mind will be active, and if it have not some useful subject upon which to spend its energies, it will feed on trifles. To

as ignorant of Natural History as a boy of his father's library, which he has only seen through the glass doors of the bookcase. The natural world, instead of a *living*, is actually a *dead* world to the mass of educated persons. They know little or nothing of its facts, and absolutely nothing of its science. It is not surprising, therefore, that most educated persons look upon the works of God, in the visible world, with as little emotion or thought as upon the works of man. They have no settled opinion, no habitual feeling, that a tree is a piece of more admirable mechanism and workmanship than the group of Laocoon, the Parthenon, the transfiguration of Raphael, or the church of St. Peter's. But, if young people were thoroughly acquainted with the important and interesting facts of Natural History, and faithfully instructed in its curiosities and wonders, with an express view to illustrate the power, wisdom, and benevolence of God, can we doubt that they would grow up with such deep and fixed opinions on those important points, as to have no avenue for doubts, either in early manhood, or in later years? Is it possible that youth can appreciate rightly these attributes of their Maker, Ruler, and Judge, when they are so lamentably ignorant of his works?

2. The second advantage to which I refer, is, that this knowledge, more than any other, except religion, (and what is Natural History but the handmaid of religion?) becomes a perpetual companion, by land or by sea, in the town or in the country.

3. A third consideration is, that the curious and interesting facts of Natural History are an inexhaustible and varied fund for social intercourse; so that many an hour now passed in frivolous or useless, if not pernicious conversation, would be both agreeably and instructively spent.

It appears to me that an acquaintance with the Natural History of man is more important to educated persons, and more worthy of high rank in the scheme of liberal education, than all the mathematics that are taught in colleges. I conceive anatomy to be a far more valuable, instructive, and noble study for a young man, than spherics, conics, &c., and if the choice lay between mathematics and the Natural History of the human species, I should prefer the latter, as a branch of college education."—GRIMKE.

remedy this, in part, we know of no better method than to interest the mind in the observation of nature, which is always around us to win our attention and call forth our imagination. Natural History is not the amusement of a day, but it opens an inexhaustible fund of enjoyment by enabling us to perceive the beauties of nature. It unseals that book in which are written the wonders of creation; it raises the thoughts and feelings, refines the taste, corrects and improves the judgment, gives mildness to temper, and amiableness to disposition, which soothe the frequent pangs along the rugged paths of life, and strew the vale of declining years with many a thornless flower, in the recollection of innocent enjoyments. It is the fountain of inspiration to the poet and orator, being the great source of metaphorical language, which gives a brilliancy to the imagination and force to eloquence. It inspires genius by giving it the elements of its action. It is the origin of painting, sculpture, and engraving; and to every art that dignifies or adorns it furnishes the material, and suggests the model. In teaching Natural History to children, then, we do but obey the dictates of nature, in introducing them to her countless wonders and varying scenes, where, if they wander, it is in innocence and light: we do but follow the footsteps of philosophy to her refreshing fountains, on whose flowery banks manhood may pause to contemplate and admire, and age at the harvest become renovated by a remembrance of the past, and be blest in the anticipations of a spring, when itself and all things shall be clothed in loveliness and beauty.

OBSERVATIONS ON THE STUDY OF THE LATIN AND GREEK LANGUAGES.

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(An Introductory Lecture delivered in the University of London, November 1, 1830.)

The object of the following address is to explain the mode of instruction in the Latin and Greek classes in this University; and also to lay down some principles of elementary education which may be useful to those pupils who intend to complete their studies here. The observations which I am going to make must be considered as the common opinions of myself and the Professor of Latin †, though I ought to remark, that, when one person writes, it is not reasonable to hold another responsible for every opinion that may be expressed, or for every fault that a curious critic may discover. I say this merely to avoid committing my colleague by anything that may inadvertently drop from me. On the general principles of our instruction we wish it to be understood that we are entirely agreed.

If I did not suppose that a large part of my hearers were either persons engaged in the instruction of youth, or parents solicitous for their children's welfare, or pupils

* Resigned July, 1831.

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themselves animated with a desire of knowledge, I should not venture to make a public address on a subject which it is difficult to invest with the attractions of novelty, and which admits not the soft and well-turned phrase that is so pleasing to the ear. It is a subject of great importance, requiring much experience and deep reflection before opinions can be formed; and its expounders must labour rather to convince the understanding, and furnish material for thought, than to gratify their audience by a display of words.

Before I explain our plan of instruction, it will be useful to make a few remarks on the reasons for giving to Latin and Greek so prominent a place in public education. Some of the best reasons will be found, I trust, in a judicious mode of teaching these languages; but there are general considerations which ought not to be passed over.

We might urge in defence of what is commonly termed a classical education, long-established usage, the authority of the most distinguished seats of learning, and the opinions or the prejudices of a large and wealthy class of our people. On the other hand, we must not overlook the fact, that, both in this country and elsewhere, the study of Latin and Greek is by some condemned as useless, or at least regarded as much less useful than other pursuits. To treat with contempt the arguments of the objectors is not the best way to convince them; nor are we likely to remedy the striking defects of English education by displaying its merits, without pointing out its faults.

I hardly know if any answer is due to those who condemn ancient learning in terms of abuse, calling it useless lumber, and qualifying it with other uncourteous

names; at least it is not my intention to attempt to answer them. Such persons are ignorant of that which they decry: they neither know what kind of knowledge it contains, nor have they considered the kind of mental training which is requisite to acquire it. Many defects in classical education are so obvious, that it requires no superior acuteness to detect them; and the opponents of the established system might perhaps get credit for some share of good sense and good intention, if, while they declaim against its errors, they would only be more tolerant towards its virtues. Differing from these persons altogether in our view of intellectual acquirements, we consider all knowledge to have its uses, and to be capable of giving pleasure: we admit some kinds of knowledge to be universally useful, and therefore necessary; other kinds have less direct or more remote uses. But in the social systems of the present age, where labour is so much divided and art so highly perfected, it is presumptuous to say that any knowledge is useless.

The question, 'What is the use of Latin and Greek?' cannot be answered till it is more limited; it is a problem which in this form cannot admit of an exact solution. It is the same thing as to ask, what is the use of measuring the earth, or the quantity of rain that falls on it?

A knowledge of these languages would be of no use to persons employed in laborious bodily occupations and in many mechanical arts; nor would a knowledge of the higher branches of pure mathematics, or the more difficult departments of any of the sciences, be useful to such persons. Besides, if such knowledge were useful to them, they could not afford the time and money necessary for its acquisition. But though the largest part

of the community are driven to early labour to procure the means of subsistence, there are still many who can defer the time at which they commence professional occupations, or the business by which they must maintain themselves.

It is for such that the higher kinds of schools—that colleges and universities are intended, in which they may receive that general education which will enable them to fill with credit and advantage the numerous situations that exist in all rich and commercial countries. The business of such places is not to teach immediately professional knowledge, though various branches of professional pursuit may be, and often are, profitably taught in such establishments: the main object is to give the kind of preparation which is necessary in all. It is usual to limit the professions to three, those of Theology, Law, and Medicine. Though certainly three of the most important, there are yet others which may be styled professions as distinguished from purely commercial employments: the business of a teacher, public or private, is a profession: so is that of a legislator, of an architect, of a sculptor and painter, and many more. The strictly professional part of these professions is often better learned, and sometimes necessarily learned, either in schools founded for the special object, or under private teachers. Now, shall the youths designed for such employments enter upon them at a very early age, and make their profession their sole study, or shall they first have a common kind of education and mental discipline?

Custom has determined that this previous education shall be given to youth, and people generally follow custom, without troubling themselves about the reasons

for it. But still there are some who argue in favour of making a professional education the only, or almost the only, object of attention; for whose consideration we offer the following remarks.

In a civilized country there ought to be an education provided suitable to the wants of every member of the community, of every member viewed as a part of the whole society. For people to know their real interests, and their obligations, is profit to themselves and security to the state; and according to the station which we are likely to occupy in social life, we should all be so trained as to discharge its duties, whatever they may be, with integrity and ability. Much of this useful training is acquired by mingling with students of the same age in public places of learning, where habits of industry and perseverance may be formed by a judicious course of study, and where the love of sound knowledge, and (what is only the same thing otherwise expressed) the love of truth and an earnest desire to discover it in all branches of inquiry, may be excited and strengthened. It is in such places that all that stock of useful information should be acquired which will furnish topics of common interest and inquiry to all men, and will often prove, in the midst of arduous engagements, or in the intervals of professional labour, a source of the purest and most unmixed delight. The pleasures of social life would be sadly diminished if each man knew nothing, and could talk of nothing but his own business: a system of castes, in some degree unavoidable where labour is much divided, would be rigidly maintained; and progress in improvement, which is the vital principle of society, would be completely arrested.

One additional remark may be made. The more

varied and correct the knowledge which a man possesses, the more likely he is to be useful in his particular station and profession. He will not be a worse doctor or lawyer because he knows something besides law and physic.

It is supposed that students who enter the Latin and Greek classes in this University have already made such proficiency as is required by the printed statements; and it might be sufficient to explain what course they pursue with us. But as the previous preparation is often imperfect (an assertion which I would not make if I were not sure that many of our pupils would bear testimony to it), I shall briefly explain what they might learn before they come here.

Both in England, and in other countries, there are experiments in progress, the object of which is to devise the best kind of elementary education. As many of these experiments are conducted with great zeal and patience, and with a sincere desire to make improvement, we should watch their progress with care, and endeavour to profit by them as much as we can. But all inventors, or people who suppose themselves to be inventors, become passionately in love with their own devices, and are often surprised that others have not the same liking for them. While we admit, then, that much, very much, is bad in our system of English education, we must not suppose that every thing new is therefore good: we must show that a new thing is better than an old one, before people will be inclined to shake off habits that are inherited, and usages to which time has given the character of sanctity.

It must be admitted that in all education, not professional, the discipline to which a youth is subjected is

more important than the knowledge which he acquires. The knowledge is often directly useful, besides having many collateral and remote uses; but in the mode in which it is acquired consists the chief value of the acquisition.

To prepare, then, the youthful mind for higher and more difficult investigations, shall we begin with the Latin language at a very early age? or shall we teach, as some (though I believe not many) would do, a science with its technical terms? I think we should do neither. The study of language, as a branch of knowledge, and as a mental discipline, must be preceded by other knowledge; and to teach the nature and properties of matter organized or unorganized, as a science, is not practicable until a stock of language is acquired.

Some judicious teachers have observed that the natural objects around us are those to which youthful attention is most easily directed. Their obvious qualities it is of the first importance to know; and this knowledge is literally useful. These teachers would direct attention to the outward structure and habits of animals, to their most striking characteristic differences, and they would explain their economic uses. They would, in fact, teach Natural History by living specimens, by engravings, and by familiar description. In the same way they would teach the obvious properties and uses of vegetables and minerals. Things thus become known; at the same time that language is learned, it is extended; and it may be learned with more precision, because distinct notions become attached to words. It is easily seen, too, how important it is to attend to minute differences in words, as these often indicate great

differences in things, and must therefore be used with accuracy.

If there is any fundamental principle in education which is indisputable, it is this: the first part of a child's education should have for its object to make him understand his urgent necessities and the modes in which they are satisfied: this brings him at once into direct relation with external things, and leads him to a more careful examination of them. But it does more than this: if well directed, this first part of education is the proper introduction to the knowledge of that social state into which he must some time enter.

Another branch of study of early interest, and of direct utility, is Geography, not on an extended scale, but within its proper limits. There are ample materials for early instruction within the boundaries of our native country, without oppressing a pupil with descriptions of foreign countries which he cannot comprehend. It would be easy to connect with these studies some easy instruction in the art of representing objects, an art of immediate utility in forming the hand and the eye, and afterwards applicable to innumerable purposes of profit and pleasure. To these we must add, as essential, the knowledge of quantity, or Arithmetic, which, when taught in a rational way, forms one of the best kinds of discipline.

I believe that instruction of this kind will be a better preparation for future knowledge of every description, and particularly for the study of language, than the usual elementary education given in this country. It must be distinctly understood that I limit this previous instruction to what is simple; it excludes all theories

and systems, and as many hard words as can be dispensed with.

One of the most important studies for all persons, is that of human speech, and of written language, which is its visible form. Language is the medium by which knowledge is communicated and preserved. When used with precision it is the means of instructing, convincing, and persuading: its misapplication leads to confusion in our conceptions, and to many very great errors in the science of morals, legislation, and other kindred subjects.

It is supposed, by some teachers, that the study of the native language is sufficient. It must be admitted that it may be taught independently of any other language in such a way as to give the pupil some insight into its structure, and likewise the habit of tolerably correct composition. But these ends can be better obtained by teaching the pupil another language, and by the practice of translation. If the student does not translate, he must have recourse to theme-writing or essay-writing, in order to learn what is styled 'the art of composition.' In general, a sentence containing some moral maxim is the text proposed, and this is to be fashioned and refashioned in all possible forms, until the pupil has produced, for the task-master, the required amount of labour. This is a bad exercise—to demand reflection and words, when the material has not been supplied.

The advantages of translation are these. We learn our own language better by labouring to transfer into it the ideas attached to the words of another language. It is not till we compare one thing with another that we understand the properties of either; and the acquisition

of a new language (those who have not tried must take it on credit) is like the acquisition of a new power. It is so indeed with all kinds of knowledge. The exercise of translation may be made at first very easy; as when the subject is a simple narrative. It is a somewhat more difficult and higher exercise to translate the language of oratory; and it is an undertaking of the greatest difficulty, requiring a matured judgment, when we attempt to translate works that treat on metaphysical, moral, and political science. Thus translation furnishes us with the means of proportioning the difficulty of the task to the power of the pupil, and tends to defer the day at which the youth first tries his strength in original composition. Opinions may differ on the value of the exercise of translation as viewed here; but many careful observers think that very early attempts at original composition are unfavourable to future excellence.

The Latin and Greek are the two tongues that we use for the instruction of youth in the Science of language. As other nations besides ourselves use them for the purpose of instruction, there must be some common reason for it. A knowledge of a modern language, it seems, is not considered sufficient; and perhaps it is supposed, which is quite correct, that modern languages, as a general rule, are acquired with more ease and completeness when a youth has gone through a good training in the ancient tongues. This doctrine, however, does not oppose the learning at least one modern language, the French, at an early age, and in connexion with the Latin; by which kind of comparison between the parent and its offspring, we believe that both might be learned with more accuracy and ease.

The use of the Latin has not been a matter of choice;

it has descended to us from our fathers, like many other things. The western part of Europe dates its history and its social improvement from the era of the Roman empire. From Italy the Latin language was spread into the provinces, where it became the language of law and of administration, and, by consequence, of the educated; and, by the establishment of Roman colonies, it must have become too, in many places, particularly in towns, a popular tongue. Through violent political storms it was cherished by the learned few, and by the church; for to the church particularly we owe its preservation. Latin has not yet ceased to be a common medium of communication for scientific men and scholars, though it does not possess its once exclusive empire.

The Greek language belongs to Eastern Europe and to Asia, in many parts of which it continues to be written and spoken to the present day. Changed, indeed, but not deprived of its essential character, it has had a longer existence than any other language of which we have written evidence. The introduction of this as a general study* into Western Europe cannot be dated as far back as three centuries. It became an object of curiosity from the knowledge which it contained; and we owe its early cultivation quite as much to those who studied its scientific works, as to the admirers of Grecian eloquence and poetry. The writings of the

* Greek was well known to learned individnals in western Europe and Great Britain long before the so-called revival of letters. Indeed it may be asked, when was it ever totally unknown in France and England, after the introduction of Christianity? Richard de Bury, Bishop of Durham, writes in 1344, "We have taken care to provide for our scholars a Hebrew as well as a Greek grammar;" yet this was not an age of great learning (See Philobiblon, London, Thos. Rodd, 1832.)

Greeks on mathematics, geography, astronomy, medicine, and natural history, &c., were calculated to give an impulse to the age. It was soon discovered also that Latin and Greek were parts of the same thing: they were found to be kindred languages; the history of one was interwoven with the history of the other. Neither can claim the privilege of primogeniture, but both derive their pedigree from a common and far-removed ancestor.

The political empire of the ancient world was divided between them; nor did the influence of the Greek cease when the Roman soldier had occupied the kingdoms of the Seleucidæ and the Ptolemies. It still traced the antiquities of the imperial city, recorded its triumphs, and continued to be the annalist of the feeble empire of the East.

The intrinsic merits of the Greek language for copiousness, perspicuity, and capability of exact classification, and the excellent models which it offers in the historical style, in oratory, and in the drama, have preserved and extended the study of it. For the theologian the Latin and Greek languages are a professional study; and accordingly some of the greatest masters of ancient learning have been found among the clergy.

Latin and Greek have, by various causes, some of them just alluded to, become interwoven in every form of our social life. The terms of most ordinary use, as well as those of science, show the traces of this intermixture as distinctly as we observe in some countries the blending of different races of people. We cannot destroy the relationship were we ever so anxious to do so. The history of our civilization, traced to its source, contains the history of those nations from whom

we received it; and so far the history of Greek and Roman civilization is part of the history of our own. What we have received from these past times is an inheritance which we should try to turn to most account: it would be foolish to throw it away; it would be still more foolish not to try to improve it, or to retain any part that is not worth keeping. These considerations may serve to explain why, out of all ancient languages, the Latin and Greek are made the subject of education. There are other ancient languages, such as the Hebrew, the Coptic, the Sanskrit, and several more, which employ the industry of many scholars; but they are neither so intimately connected with the progress of our civilization, nor do they possess the advantages for youthful discipline which the other two do.

In explaining our mode of instruction in the Latin and Greek, I shall speak as if the whole business were carried on within these walls from the commencement; and I do this, not because I suppose that all plans are bad which differ from our own, nor that any faultless plan can be devised, but that those who are preparing pupils for this place may unite in making their instruction and ours parts of one scheme. Again, I should not volunteer any suggestions for elementary education, if I did not know, both from direct communication and otherwise, that many teachers wish to possess a more complete development of what we attempt to do. They will thus at least know more precisely the kind and degree of knowledge that our pupils ought to come with, though they may in some respects differ from us in the mode of imparting this knowledge.

The use of Latin and Greek consists, first and principally, in the mode in which these languages are

taught; and on the mode will depend, secondly, the amount of exact knowledge obtained. This latter we believe to be a secondary consideration; but I shall still endeavour to show that the amount of useful knowledge attainable in a good course of classical instruction may be increased much beyond what it ordinarily is. We suppose that our students in general will terminate their classical studies at an earlier age than they do in the two ancient Universities of Oxford and Cambridge, and that they will proceed from the study of Latin and Greek to some other branches of learning, or that they will begin to combine professional with general education somewhat earlier than is now usual. But we do not, therefore, suppose they will not learn Latin and Greek well: we know that both languages can be learned well in much less time than they are often learned very imperfectly. The student may begin later, and he may end earlier; he will end with the instruction of the teacher, but he will be endowed with the power and the wish to continue the labour of self-instruction.

The study of the ancient languages is generally commenced too soon. The age should depend partly on the capacity of the pupil, but principally on previous acquirements of the kind which have been described. The early age at which the Latin language is begun is the chief reason why the grammar system continues. In youth the memory is retentive, but the understanding is unformed; the accidents of words and the precepts of grammar can be committed to memory, and repeated long before they are understood. According to the grammar system both teacher and pupil do all that they can do; one repeats, and the other listens;

the duties of both become mechanical, and consequently irksome.

An elementary grammar should be very short and simple; it should exhibit nothing more than what is technically called the accidence, which comprehends the declensions and conjugations. Nor should even this grammar be committed to memory as a preparation for the study of the language, but it should be used as a book of aid and reference in connexion with the teacher's instruction. To learn a language, the pupil must have a language before him. He must see specimens of the material on which he is called to exercise the faculties of observation, judgment, and memory. Some short sentences then, at least, are necessary for a beginner; and they are perhaps better than a continuous narrative, because the latter is very seldom found to be simple and clear enough in the structure of all its sentences. A short sentence, containing one proposition, is much easier than those found in consecutive description, which necessarily requires all the modes of speech which constitute a language. As a continuous narrative, however, possesses the great advantage of attracting the pupil's attention by the nature of the subject, this is so far a good reason for preferring it; but it will be found to be a great aid to the student, and an almost necessary one, to break up each complex sentence into distinct propositions, or simple sentences, for the purpose of avoiding at the commencement the difficulties inseparable from long and involved periods. It woul be easy to form the first book of Cæsar into short sentences of the kind described, and to bring the student to the examination of the complex sentence after he has mastered all the varieties of the simple proposition.

But how is the pupil to prepare his lesson, to find out the meaning of this new language? Shall he try to do it with the aid of a general lexicon? Shall we ask him to perform the work with a bad or imperfect instrument, which he does not know how to use?

Some elementary books are furnished with a small lexicon, adapted to explain the words of the book in the sense in which they occur. This is a great improvement. Some teachers recommend what is called a literal translation, accompanied occasionally by one more free and elegant.

Perhaps the oral instruction of the teacher is better than all for young learners. It is the essence of good teaching to make things easy to be understood, and pleasant to learn; and this may be done by the teacher explaining to the pupil his short lesson, by giving him the meaning of each word, and by pointing out, as soon as he thinks it advisable, the modifications which its ending or termination undergoes from its connexion with other words. This is, in fact, teaching the elements of grammar; for which purpose it will soon be found useful to have a book that shall contain the general form or models under which are comprehended all the particular instances that the pupil can meet with in his lesson. It *may* be found convenient for the pupil even to commit to memory the general forms or examples of this grammar; but certainly not before he has frequently met with particular instances in his reading, and has been led to observe the advantage of comparing them, and arranging them for the purpose of aiding the memory. After the student has received instruction in his lesson, there remains the business of examination, which consists in proposing questions, in presenting the matter

in all the varieties of which it is susceptible, and thus leading the pupil to observe in new sentences, without the teacher's aid, the facts which he has already learned. The teacher may soon vary the lesson by the reverse operation of giving the pupil the English expression, and requiring him to repeat and also to write the corresponding Latin. In this way words are learned with their grammatical accidents, and, what is quite as important in a language, the proper order of words is acquired. A system that teaches by transposing the words of a language, ancient or modern, is not good.

It will be observed that this reverse operation is really almost the same thing as committing the lesson to memory; and when the lesson is well understood in all its parts, it is found, by experience, to be a good exercise to commit a small portion of it to memory, and one attended with very little trouble. A proper examination into every word will prevent its becoming a mechanical task. When I speak of committing part of the lesson to memory, I do not wish to be understood as recommending this practice to be applied to every lesson during a long course of instruction. The advantage of knowing by heart a portion of an author is briefly this. A student will make the part with which he is so familiar the test and the standard by which he will try and estimate the various words and phrases that occur in other parts of the book. It will be a grammar, because it has been carefully analyzed and thoroughly impressed on the memory by a proper study; and it will be more than a grammar, as it will furnish a great variety of modes of expression, applicable to the explanation of similar phrases that may occur. It is, in fact, the next thing to making the dead into a living language.

All the advantages to be derived from this practice are obtained by committing to memory the first ten or twenty pages of the book which is made the basis of the student's knowledge of a language. For we think that *one* book should be made the basis of all this knowledge, and that this book should be a prose author.

It is almost unnecessary to remark, that committing a lesson, or any thing else, to memory before it is understood, is just the reverse of what we are labouring to recommend.

In learning a new language we should begin to read an entire book as soon as we can; one that will give the teacher an opportunity of connecting with his grammatical instruction useful remarks on the subject-matter generally. A book of prose is better than one of poetry, though some kinds of descriptive poetry may be occasionally used with profit; and a narrative or history is better for a young pupil than oratorical declamation or books on moral subjects.

When a student has made some progress, and when he has begun to read an author, he must be taught to observe more accurately the relationship of words to one another, or the idiomatical usages of the language. These usages, when classified, are comprehended, at least part of them, under the head of syntax; and it is not unusual for the rules of syntax to be committed to memory long before the student either wants them or understands them. Sometimes, too, the rules themselves are written in Latin, and, as all may recollect who have been subjected to the experiment, they are for a very long time either misunderstood or not understood at all. If a complete system of rules is committed to memory, many of rare occurrence and some of doubtful character

occupy an equal rank with those of constant use and indispensable necessity. Besides all this, why should we make our mode of acquiring this particular kind of knowledge different from the ways of getting all other information? Knowledge consists of facts observed, arranged, and remembered, and the chief value of it often lies in the habits formed by the labour of acquiring it. For these reasons, we would teach syntax, at the commencement, entirely from observation, explaining to the pupil each example as it occurs, and leaving him to discover similar instances himself. Instead of requiring a rule to confirm a case of particular usage, it will be found quite as simple to ask the pupil to produce from his own reading one similar example, or more. Difficult modes of expression must be repeatedly explained by the teacher, who will find that the book which the class is reading furnishes the best materials. For a pupil somewhat advanced, a larger kind of grammar, containing a complete syntax, is useful, and even necessary, to serve as a general storehouse whence he may derive additional examples, or new illustration, or the confirmation of that which he has already acquired. The comments of professed scholars, too, become useful guides for the student, as he proceeds to the perusal of more difficult authors and to the more critical study of the language. But no set of rules committed to memory, and then applied to books, will either form a sound scholar, or, what is infinitely more important, create habits of patient observation and just judgment. A man might be acquainted with the results of many profound inquiries in physics and in all the various sciences; he might take them on credit, and act as if he believed them to be true; but his understanding would not be

one jot advanced above that of an uninstructed workman. If the knowledge of all facts and the conclusions of all research could be poured into a man's mind, without labour of his own, he would be less really wise than he who has been properly trained to work the rule of three.

There is an objection to the study of syntax as taught in grammars which needs to be stated. Syntax, or 'arrangement,' is that branch of grammar which affects to explain the general principles by which the order of words in any language is governed, and the modifications which the several words composing a distinct sense undergo in consequence of their being subordinate to this order. Language consists of words, and the order of words, as just explained. Each language has an order of words peculiar to it, such as the Greek, the German, the English, and others; not an order so fixed that there can be no deviation from some general formula; but still an order which positively disallows many collocations of words. The common rules of syntax do not treat of this part of the subject; they seem to treat only of the modifications of the several words, owing to their relationship to other words in the sentence. All languages are composed of sentences, or of parts into which a discourse easily distributes itself. All sentences contain assertions, facts, or, properly speaking, premises; they also contain inferences or conclusions, either obviously and clearly, or tacitly and obscurely deduced from these premises. The process of reasoning then is necessarily included in the form of every language; and as the principles of logical reasoning are always the same, these principles are applicable and should be applied to the analysis of all language.

To point out the difference of the form which equivalent sentences assume in one language, such as Latin or Greek, and in our own, is a part of syntax properly taught; and syntax, when made what it ought to be, is inseparable from some instruction in the science of logic *.

I shall now endeavour to explain more clearly the advantage of translation, graduated in difficulty according to a pupil's progress, and the kind of information to be derived from classical studies; and, as part of the same subject, I shall attempt to show the use, the necessity, and the ease of studying language according to true etymological principles.

All languages, and particularly written languages, consist of a great number of words, to which are attached certain ideas. The uttering of a sound, or the exhibition of its written representative, is the mode by which we communicate the impressions made on us by objects of sense, and also the result of mental operations. If each idea had a sound or word to represent it, language would be almost unattainable, from the number of its component parts. But the same word has various meanings, some primary and more common, others derived and less common. The ordinary and primary meaning of a word indicates in general the immediate impression made on the organs of sense: hence a large class of words are only imitations of natural sounds, which the human voice can produce with ease, and can thus, even in the

* See an article on parsing (by Mr. Alexander Allen of Madras House, Hackney) Journal of Education, No. XX., which is referred to not so much to illustrate what is here said, as to show what may be made of 'parsing,' as it is termed, in the hands of those who know how to manage it.

absence of the object, make it present by one of its sensible properties. A serpent *hisses*, burning wood *crackles*, falling timber makes a *crash*, and heavy iron chains *clank*. The words *even*, *upright*, *smooth*, *crooked*, denote sensible properties of matter; but we apply the same words to denote our judgments of things of a moral nature. We say that a man's temper is even, and his conduct is upright; or we may sometimes have occasion to say, that though his manners are smooth, his dealings are very crooked. The usage of words in these secondary senses is vague in all languages; and it is particularly so in that class of words used to express praise and blame. Writers on moral and political science often labour to give stability and precision to terms which in popular language express nothing definite. Many such words still move about in ordinary society; they are well received and often entertained, but nobody thinks of asking who or what they are.

Now this more exact study of the meanings of words, or their primary and derived senses, is very much facilitated by the teacher requiring the student to point out, in the lecture-room examination, the original meaning of the word, and to trace from that its other remoter meanings. This kind of investigation is often a real historical inquiry, involving more research and more knowledge than a pupil possesses; but the teacher can direct his inquiries, and supply their deficiencies, and correct any erroneous conclusions. But by written translations, an exercise of the greatest importance, the pupil will be taught to study more exactness than is practicable in oral translation: he will select words with more ease, weigh them with greater

accuracy, reject what is superfluous, and labour to express in simple and perspicuous language exactly as much as is contained in the original, and neither more nor less. It is the teacher's duty to examine these exercises, to point out their defects either in the mode of expression or in the interpretation; and it will be found a very useful part of instruction for him to take one or more of these exercises, and to make their merits or defects the subject of remark to all the assembled class.

The books used for instruction in the Latin and Greek are most commonly books of history, oratory, epistolary correspondence, moral philosophy, and the various kinds of poetry. They have been chosen because they treat of topics of most general interest, and are written in that style of language which may be called the popular or common. For it should be observed, that language is of many kinds, and that each science has a language of its own, which is only understood by those who know the science. Many books in the English tongue are unintelligible even to a well-educated man, if he knows not the things of which they treat. In Latin and Greek, then, we do not read with our pupils the works of Hippocrates, Galen, Aretæus, and Celsus; because neither we nor they understand the science of medicine. We all know that it would be very tiresome and unprofitable to read about things which we cannot comprehend.

But the books that we do read treat about things also, and if these are not understood or explained, we lose much of the profit that might be derived from them. Let us make a short enumeration of the books that are commonly studied in schools and colleges:

they are Cæsar's Gallic Wars, Cicero's Correspondence and his Orations, Tacitus, Livy, Virgil, Horace's Satires, Epistles and Odes, and other books in the Latin language. In Greek we read Xenophon's Military Expedition of the younger Cyrus, Herodotus's History of the Wars of the Greeks and the Persians, Thucydides, the Orators, Homer, the dramatic writers, and others. As all students, before they come to the study of these writers, have read similar works in their own language, they are better prepared to understand them than the medical works I have mentioned, or the Greek text of Euclid, where the subject-matter being entirely strange would render the language incomprehensible.

But the books used in the common instruction in Latin and Greek contain a great number of things that require explanation; and it is this part of our public education which appears to me to be most defective. It is not uncommon for students to read many of the best authors without paying any attention at all to the subject-matter, which, if properly explained, might be made the means of connecting with the study of the ancient languages much information directly useful. The slight attention that is paid to the historical facts, seldom extending beyond a chronological arrangement of them, and the imperfect way in which geography is studied, hardly deserve mention. There is not a book that can be named of the classical authors usually read, which does not furnish a teacher with innumerable opportunities of instructing his pupil in some fact or other, *necessary* for the better understanding of the text, and *valuable* because it is knowledge. A short enumeration will explain my meaning. In historical writing we find

alluded to or described countries and their products, rivers, mountains, cities, temples, coins, laws, commerce, and political events; different races of people, naval and military warfare, and many other things. These, when arranged, will comprehend the political history of a nation, the history of different national stocks, comparative geography, the study of coins and medals, of natural history, physical geography, the history of commerce, the history of the law, &c. A boundless field of inquiry is here opened to the zealous teacher and the aspiring pupil; and though our education is yet too imperfect to enable any teacher to command this wide range of knowledge, it is still possible for him to conduct the pupil through part of it, and to point out the track to be pursued. It may be said by those who would rather decline the labour which is here proposed to them, that this kind of instruction would lead the pupil away from his legitimate object, which is the knowledge of the language, and that after all his labour he would learn nothing at all. This will not be the case under a skilful teacher. The amount of explanation should be varied according to circumstances; it should depend on the pupil's age and on the book that he reads. If this book be Cæsar's Gallic War, the pupil can learn, by the aid of his teacher's instruction and a good map, the positions and names of all the places in modern France that represent those mentioned in Cæsar. He will also hear occasionally short topographical descriptions, which always please and instruct youth; and he will often be tempted to make inquiries himself when his teacher has not satisfied curiosity, or has referred him to books for further information. The pupil will be taught also to

compare the ancient Gallic boundaries with the various frontiers of modern times, and to trace in the mountains, rivers, provinces, and departments the names that existed when Cæsar was in Gaul. He will receive incidentally some little information on the way in which these positions and facts are determined; and they will be recalled to his memory by frequent examination. Thus he will learn tolerably well the modern geography of France, and he will know more about the country than a great many who have travelled through it.

It would require a separate examination of each book to explain the particular kind of illustration which it requires. In the perusal of such an author as Herodotus, so extensive and varied will it be found, that the teacher must use much judgment in not overloading the pupil's mind, which would be as great an error as the usual system of leaving it unfurnished. The great advantage which may be derived from explaining the subject-matter of the ancient authors is, the power of attracting each student by the variety of the entertainment. One will find his chief amusement in etymological inquiries, in ascertaining the roots of words, and comparing them in Latin, Greek, and in the kindred tongues; a second will find more charms in studying the ancient sites of cities, their ruins, coins, and other works of art; and a third may find most pleasure, in his advanced studies, in examining political events and legislative enactments, or in tracing the progress of navigation and commerce in the writings of antiquity. Thus each for his own particular purpose may have a motive for joining in the common pursuit; and he may carry away a treasure of useful facts and pleasing associations, by which his future professional studies will be aided and adorned.

In the business of active life we cannot always be labouring at one thing: we require amusement and relaxation, or at least variety; and the most rational and most enduring of pleasures are found in improving and extending our youthful studies.

I shall conclude with explaining the etymological mode of teaching the Latin and Greek, much more briefly indeed than the importance of the subject demands; but I hope I shall succeed in demonstrating its utility, and attracting more attention to the practical uses of this branch of philological inquiry.

The study of the Latin and Greek languages is facilitated by the regularity of their etymological structure; a fact universally admitted with respect to the Greek, but equally true, though less observed, in the Latin. When the etymological part of these languages is learned by the aid of a proper classification, the value of the study as a mental exercise is much increased: attention is excited, labour diminished, and the foundation is laid of a sure and rational method of prosecuting the study of any other language. When the student shall advance in his inquiries into the relationships and differences of the kindred tongues of Europe and Asia, he will find a high gratification in extending those views which were presented to him in his elementary studies.

An examination of the words of a language, such as our own for example, will show us that the roots or elements are not numerous, when compared with the whole number of words. In many examples we see one element with a distinct signification modified by parts added to the word, commonly called affixes or suffixes. Thus we have *love*, *lov-er*, *love-ly*, *love-li-ness*, in all

which instances the notion of *love* receives a particular signification by the addition of the various suffixes. We find too, on examination, that the *same* termination is joined to a great number of words, as *wood-en*, *flax-en*, *earth-en*, *wool-en*, and then the new word denotes hat the objects to which this term is applied are made of these materials. The same termination in the Greek language gives the same signification, as πηλ-ιν,ος, ξυλ-ιν,ος, &c.

Sometimes we can discover, either in the same language or by the aid of the kindred tongues, that this termination is really a distinct word with a definite meaning: thus, in the examples *love-ly*, *low-ly*, we know that the termination *-ly* is an abbreviated form of the word *like*, in which way it is still distinctly pronounced in some of our provincial dialects. Again, in other cases, as in the words *wood-en*, *flax-en*, &c., the modified meaning of the new word is only ascertained by comparing a great number of examples.

This kind of classification forms the basis of the more accurate etymological instruction in the Greek and Latin.

Our elementary grammars, and even many that are not elementary, contain little more than the accidence under the head of the nouns and adjectives. This accidence only exhibits the various terminations, or cases (as they are technically called) which these words admit, owing to their connexion with other words in sentences. The pupil should certainly be taught, from his first acquaintance with the Latin nouns, to distinguish the root or elementary part from the various case-endings; and in this way he will be trained for the more complete etymological examination of the language. But when merely

the cases are learned, the pupil has made only small progress; every new word that he meets with is a stranger, with whom he has to form an acquaintance. To save the trouble of a separate introduction to all, it will often be found enough to know some relations of the family. The simplest relationship that we can suppose is where one noun is derived from another, or for convenience' sake may be said to be derived. When a pupil knows the nouns *merx*, *via*, *nugæ*, *pax*, he should be taught to observe that *merc-ator*, *vi-ator*, *nug-ator*, *pac-ator* contain respectively the same elementary syllable as *merx*, *via*, *nugæ*, *pax*, &c. when stripped of their case-endings, and that a new meaning is given by the addition of the syllable *-ator*. Or, suppose that the pupil first meets with *merc-ator vi-ator*, &c. he should be taught to observe the common ending of these nouns, and that by adding a different termination, as in *vi-a*, he has a new word with a different meaning.

If the pupil is acquainted with any words that are called verbs, or verbal roots, his vocabulary will rapidly be extended by the addition of *am-ator*, *ar-ator*, *imper-ator*, &c.; and, as a further step, he will find a long list, in which the syllable *-tor* is not preceded by a vowel, but by a consonant of the root. Thus he will discover and arrange in his note-book, *duc-tor*, *vic-tor*, *fac-tor*, *lec-tor*, &c. He will then begin to consider (for the advantage of this system is, that he will think while he is learning Latin)—he will consider, or he may ask his teacher, if *lic-tor* is related to *lig-o*. The regular form would be *lig-ator*, like *ar-ator*, &c. Another question will now arise, why have we a *g* in *lig-o*, and a *c* (which in fact is a *k*) in *lic-tor*? The teacher will then be led to explain the powers of the letters, which depend on the way in

which they are formed by the organs of speech; consonants *similarly* formed by the same organs, such as *b*, *p*, *m*, are interchangeable; and other consonants, according to the same principle, occur generally in certain pairs or groups. Thus we find *mp*, *mb*, *nd*, *nt*, *kt*, *gd*, and other similar combinations. It is no argument against this general principle to say, that inscriptions, both Greek and Roman, often present such combinations as *np*, and that our present orthography of the ancient writings is not always correct. If an *n* precede a *p* in any language, the sound of the *n* will be modified; if it is not changed into that of *m*, it will be as near it as possible. In an inscription, or even in a book, it is quite unimportant whether or not *m* is written instead of *n* before a *b* or *p*; the eye sees the modifying consonant, and the mouth regulates the pronunciation accordingly. In our printed books then, where the written letters are in such cases adapted to the sounds, what we have to do is, to explain to the pupil the reason and the reasonableness of the present orthography.

When the nature of the letters is understood, the pupil will recognise the relationship of words, even though they may be partly disguised by appearing in a shape somewhat different. This remark is more particularly applicable to the Greek language, where the final consonant of a root is so frequently modified by the initial consonant of the termination, as in λα(μ)β-ανω, λημ-τος, συλ-λημβ-δην, λημ-μα. A proper study of the powers of the letters is also closely connected with a *rational* examination of the elementary principles of prosody; I say *rational*, because the grammar rules of prosody are often both imperfect and incorrect, and do not sufficiently connect the study of prosody with that of the etymological formation.

In examining the verbs, we cannot fail to perceive that the various forms of the tenses are really new words, which have their precise signification determined by the suffixes. The tenses of such a verb as *ag-o*, viz. *ag-ebam*, *eg-i*, *eg-eram*, *ag-am*, are all arranged in the grammar, and even committed to memory very early, as well as the tenses of the subjunctive and infinitive. But these forms are of infinitely less use for a young student than a knowledge of many other derived words containing the same element *ag*. Thus we have *ac-tus*, *ac-tor*, *ac-tio*, *ag-men*, *ag-ilis*, and others, not only of frequent occurrence, but belonging to classes which contain as many examples as the tenses of the verb do. Of the class of *ag-ilis*, we have *fac-ilis*, *hab-ilis*, *hum-ilis*, *ut-ilis*, &c.; and of the class *ag-men*, we have *nu-men*, *flu-men*, *lu-men* (luc-imen, from luceo), *no-men* (from no-sco), &c. The inference that is deducible from all this is, that boys should be early, very early, taught to compare words in this manner, and to classify them, for the purpose of aiding the memory, improving the understanding, and learning the language more expeditiously and completely. Perhaps some teachers may not have observed that a boy may read the whole *first* book of Cæsar without knowing any other part of a verb except the third person singular and plural; but he cannot read the same portion without meeting many instances of the kind of words which have been enumerated.

By this examination of the forms of words the student does not learn them singly, but in classes. In each word he sees a root which has a distinct meaning; he observed also a termination and its modifying power. Should he then find a word that he has not

before seen, but with a termination that he is acquainted with, he examines the root part; and if he should have met with that root before, even in a different kind of word, he will be able to conjecture the meaning of the new word with probability, and often to determine it with certainty.

When a teacher proceeds in this manner, pointing out to a student the various forms of words in which a common element occurs, he must necessarily remark, or if he does not the pupil will, that there is often some difference of meaning in these words, more than will be accounted for by the difference in the suffix. It is an important object then to endeavour to assign to the root or element a primary signification, from which may be deduced, both the various meanings of any one word in which the element occurs, and also the various meanings of all other words formed by different suffixes, and containing the same root.

An example will make this clearer. The primary notion of the word *reg-o* is *to make straight*, or *to make a straight line;* hence are derived the meanings of *to direct*, *to control*, and *to govern*, in a political sense. The word *rec-tus* means *straight*, opposed to *curved*, *crooked; recta linea* is a mathematical right line. From this notion comes that of *right*, in a moral sense, as opposed to wrong. *Reg-ula* is a *carpenter's or workman's instrument*, by which he ascertains the evenness of a plane surface, or the correctness of a straight line: hence we have the word used in the sense of any *rules*, or *directions*, the object of which is to keep things, as we say, straight. It is unnecessary to say more on this subject; but I must remark, that, in the present state of our school lexicons, instruction of this kind is *essential*

to prevent a youth from being embarrassed by the *number* of meanings given in lexicons, and by the want of order in their arrangement; and also to furnish him with that primary notion which our lexicographers, in the number of their words, have often forgotten.

The connexion between the Latin and Greek languages forms a useful subject for comparison, particularly for the more advanced student. He will often be led in this manner to assign to words more accurate significations by a comparison of their usage in both languages; and he will be taught to distinguish between Greek words really and historically incorporated into the Latin, and *vice versa*, and those which are the common property of both languages, and are found also in other kindred tongues. A student should be taught too to observe the characteristic *differences* between the Greek and Latin; and his attention should be directed to that class of Latin words and forms which indicate the intermixture of another language.

It is a common error of lexicographers and others to mark a number of English words as derived from Latin and Greek, which in fact are the common property of many tongues. The words *geography*, *astronomy*, *empiric*, *direct*, *inspect*, and many more, are really Greek and Latin words, which have been, within historical limits, introduced into our tongue. The words *geology*, *gastronomic*, *physiorama*, &c., are words that we have manufactured out of Greek materials, because we wanted them. But this class of words must not be confounded with such as *to lick*, *to know*, *to bear*, *to break*, &c., and many others, which are common to the English, Latin, Greek, and Sanskrit. These are elements which belong to one of these languages as much as to another: we observe the fact of their being found in all,

but we know nothing historically of the origin of this communion of property.

It is part of our plan to teach our students to write both Latin and Greek prose; exercises in the writing of a language being as necessary for its complete acquisition as the more common practice of reading. The exercises consist of English sentences, which contain examples of the peculiar idioms found in each day's lesson. The student has not recourse either to a grammar or a dictionary to find the tense, case, and words to be used; all he has to do is to refer to the part of his lesson in which he will find the model to be imitated. These sentences are at first very simple; but the exercise may be progressively increased in difficulty by giving the student a series of sentences containing a continuous narrative. In the junior Latin class, Cæsar and no other book is the model: in the junior Greek class, the Anabasis of Xenophon. Our more advanced students, who have begun to feel that their higher attainments must depend principally on their own exertions, are recommended to translate a portion of a Latin or Greek author into English, and after a short interval to re-translate it, comparing their own labour with the original. They can thus correct what is faulty by the aid of an unerring standard, and attain to a critical knowledge of the language by a method which is sure, pleasant, and universal in its application.

The use of writing Latin, as I have stated, is the more accurate knowledge of the language which is thus obtained; but I do not think that there is much advantage in making a student write Latin with the aid of a set of exercises with a rule at the head of them, and a dictionary to direct him in the choice of words.

To write Latin prose well is an accomplishment not common in the present day; nor is it any great reproach to a Latin scholar to say that he cannot write the language as well as Muretus or Ruhnken. It is less directly useful now than it was formerly, but it is still not without its uses.

A person may learn to write Greek perhaps with less trouble than he can learn to write Latin well; and we hope that in a short time the use of it will be felt. When the scholars of England, or France, or Germany, address the professors of Ægina, Athens, and Argos, the language of ancient Greece should be the medium of communication.

The principles of Latin and Greek prosody are taught in connexion with the development of the etymological formation of words, and the perusal of the Latin and Greek poets. It is not part of our plan to teach versification; for we are of opinion that the mechanical process of making verses is unfavourable to a proper understanding of prosody, and also to the learning of the language, besides being a great waste of time. But as opinions differ on this matter, I shall say nothing more about it, leaving the discovery and the display of all the merits of verse-making to those who are so much better qualified to do it justice.

The examinations are held three times a-year, the last and most important being at the close of the academical session. It is our plan so to frame the questions, and so to select the passages for translation, that it shall be a real examination into what has been taught in the lecture-room. Our instruction and our examination are thus parts of one whole. Every day that a student is absent something is explained; or some passage of

a book referred to, which *may be* a subject of inquiry in the examination. A constant motive for exertion and punctuality is thus maintained by making the pupil's success in the annual examination depend on his attendance on the daily instruction.

I have now explained the general principles by which we regulate our course of instruction, and I have endeavoured to assign reasons wherever our practice differs from the ordinary modes. Without presuming to suppose that these reasons will convince all who follow different plans, either old or new, I trust that our arguments may be entitled to some attention, and may tend to forward the improvement in elementary education, which has commenced, and undoubtedly will proceed. There is nothing which would exercise a more favourable influence on education, than for parents and guardians to take a little more pains in selecting proper schools for their children, and inquiring more particularly what it is that they do at school. Though many parents may not be qualified, by previous education, to judge of a youth's proficiency in mathematics and the dead languages, they may still use other tests quite as satisfactory as that of direct examination in the subjects taught. They may observe, whether the memory is overloaded with rules, hard names, and technical terms; whether, while learning Latin and Greek, they make proficiency in geography, the general outlines of history, and in the mode of writing and speaking their own language; whether they appear to be acquiring habits of punctuality, arrangement, and perseverance in finishing that which they have begun; whether the teacher has the art of giving them the desire of knowing more than the school exercises prescribe or require, and of inculcat-

ing the love of voluntary study. These are things which all may judge of who will only take pains enough to see into what their children are doing. I am not advocating any interference in the internal regulations of schools, which must be left entirely to the teachers: I merely recommend persons to watch more attentively the results of the school education, and to regulate their future measures accordingly.

To those who are ardent admirers of ancient learning I may seem, perhaps, to have pleaded its cause but coldly, and to have stripped it of its most dazzling attractions. It was my intention to do so. No studies have ever been recommended on grounds so weak; none have suffered more from the well-meant zeal of officious friends. The unskilfulness of the advocate has often well nigh ruined a cause which can stand securely on its own merits, if it be examined by competent judges. The simple and severe models of antiquity demand not the aid of the set phrase of rhetoric, nor the pomp of words, that only hides the littleness of thought. Like the noblest productions of the Grecian sculptor, they would only be encumbered by such ornament.

But though I have limited my remarks to the advantages for youthful education which result from well-directed classical studies, I am not insensible to the high gratification which they are capable of affording in more advanced age. Man finds the present too little for him; the anticipation of the future, and the contemplation of the past, are necessary parts of his existence; and his anxiety about what is to be, is perhaps almost equalled by his curiosity to explore that which has existed, and to revive its remembrance. Whether he

trace those stupendous revolutions which have changed the face of the earth, and given to it a succession of vegetable and animal life, or whether man and his history be the subject of his inquiries, it is still the same passion, ever active and never satisfied. The field of investigation is boundless, and the objects of curiosity inexhaustible.

From the national poem of Homer, which served as a bond of union to a widely scattered people, to the downfall of the empire of Constantine, and even to the present regeneration of the race, how large a portion of this period, which nearly comprehends the political history of mankind, is preserved in the remains of Greek and Roman writers. Were they lost or neglected, what a blank the past would be, and how many sources of pleasure should we leave untasted. The drama of Sophocles, and the eloquence of the great Athenian statesman, still live and breathe among us; the spirit of the past still animates and strengthens the present.

Two years ago we met here on a similar occasion, full of hope and expectation. A new era was commencing in the metropolis; a university was opened offering the advantages of higher instruction to all classes, but particularly to those who had before been excluded from it. After the experience of two academical sessions we begin to see the fruits of our labours. To the zeal, the industry, and the acquirements of our pupils we point with pleasure, for the confirmation of favourable prepossessions, or the removal of prejudice; and to our sister university of the metropolis, and the train of newly rising schools around us and her, we appeal with confidence as to the best testimony in favour of the original undertaking.

With such encouragement to exertion, with such honourable and general approbation, can we any longer doubt that an impression has been made favourable to the extension and improvement of public education in England? It is on the teachers that everything now depends: they must discharge their duties with diligence and good faith. They form one body, united for the noblest objects; their obligations, their interests, and their sympathies are the same.

As one of those engaged in the responsible business of public instruction, I would gladly see all my associates, of every class, and sect, and party, treat one another with respect. They should recollect that we have all one duty, which is, the instruction of youth; and that the example of the teacher will do as much as his precepts. I am sorry then to see those who try to persuade themselves that they are our rivals, while in fact they are our associates, take advantage of public assemblies, such as the present, to blame, in harsh terms, us who are their friends and well-wishers. But we have no fault to find with them; we bear them no ill-will; we rejoice to see them prosper in their undertakings, and we only pray, that the spirit of charity may temper the ardour of their zeal.

N.B.—Some small additions and a few verbal corrections have been made in this article. The conclusion, and a few other passages, it will be readily seen, had reference to temporary circumstances.

EXPOSITION OF AN IMPROVED METHOD OF TEACHING MODERN LANGUAGES.

By W. WITTICH.

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[As it is one of the objects of this work to describe establishments for education whose general merits appear to entitle them to this notice, so we conceive it a part of our duty to give publicity to modes of instruction which are founded on rational principles, and have been tested by experience—without however, in either case, holding ourselves responsible for all matters of detail.]

The acquisition of ancient as well as modern languages is justly considered one of the most important branches of education. The study of the ancient languages, particularly Latin, as a department of useful knowledge, and as a means of mental improvement, must be referred to a much more remote origin than that of modern languages. Indeed the study of the latter cannot be traced farther back than the fifteenth and sixteenth centuries, when a spirit of commercial enterprise began to animate the nations of western Europe, as the communication between them was then becoming more secure and easy.

The object for which the acquisition of each set of languages became desirable was different in its very

origin, and continues to be so. By applying himself to the ancient tongues, the student wishes to obtain access to that information which can only be fully acquired by the reading of ancient authors, and likewise to refine his taste by a close examination of the languages in which those authors clothed their conceptions. Thus the main object in studying the ancient classics is to improve the mind. It is not so with modern languages. The improvement of the faculties is not *the only* nor even the principal object for which *they* are acquired. The knowledge of *them* is desirable for *a more practical use.* By means of it the communication of nations that speak different languages is rendered more easy, more intimate, and more extensive. Hence it follows, that, in studying the Greek and Latin languages, all our efforts are directed to the acquisition of so much of these languages as will enable us *to read their classic authors* with ease, and to comprehend completely what they say. But the modern languages are principally learned for the purpose *of expressing* with ease *our own conceptions both in speaking and writing.*

The objects being so different, it would seem evident that they are to be obtained by different means; but with surprise we observe, that the methods used in teaching both sets of languages are the same; and still more strange must it appear, that the mode of studying modern languages has received no important improvement which had not previously been introduced into the teaching of ancient languages. These improvements are indeed not numerous. They do not amount to more than a single one, but, it must be confessed, one of great importance, which was introduced not quite a century ago. Before that period no other mode of teaching lan-

guages was known than that of explaining an author; and as a means of facilitating that instruction, a few ill-digested rules of grammar were previously inculcated. In those times, only such as were endowed with an extraordinary memory, or had abundance of leisure which they were inclined to employ in a long, tedious, and laborious task, could acquire either ancient or modern languages. But towards the middle of the last century *exercises for writing* were generally introduced, and they soon proved to be a most important means for facilitating the acquisition of languages.

The advantages arising from this improvement were indeed great. Before its introduction, the true sense of grammatical rules could only be attained by numerous previous mistakes. However well they were conceived and expressed, the words used in laying them down could not convey the exact meaning to the mind of the young learner, without some very conspicuous instances of the application of the rules. Such instances, however, were not brought forward when the rules were inculcated; they were reserved for the reading of the authors themselves, and then they were intermingled with so many other rules, that it required more ingenuity and sagacity than falls to the common lot of men, to disentangle at once the confusion, and to arrive at clear conceptions. This confusion was greatly increased by the necessity of acquiring most of the grammatical rules and forms, before an attempt to read an author could be made. For it is impossible to read a very few sentences of a book without being obliged to refer to at least two-thirds of the grammatical forms and rules; and hence arose the necessity of knowing them all before the reading of an author could be attempted with any

chance of success. Now whoever considers that every grammar is only an aggregate of a considerable number of very minute and unconnected facts, cannot be astonished that this kind of study produced, even in the clearest minds, such a confusion and uncertainty as could only be overcome by long-continued efforts of very intense study.

These disadvantages are, to a great extent, removed by the writing of exercises. The most important grammatical forms, and a few rules are selected, and the manner in which they are to be applied is not only shown in a few examples, but strongly impressed upon the memory by the operation of writing copious exercises. As soon as the selected part of the grammar is firmly rooted in the memory, another selection is made and treated in the same manner; and so on till the greater part of the grammar is thoroughly acquired. By this method a considerable degree of order has been introduced into the chaos formerly existing; and order, as is well known, is the great support of memory. At the same time the operation of writing down well-chosen sentences conveys better than any other means the true signification of words and phrases, and impresses them more strongly upon the memory.

It is doubtless a matter of regret, that, as the advantages arising from writing exercises are so great, the method should not be followed up to a much greater extent than is commonly done. The desire of so many teachers to exhibit the great progress made by their pupils in a short time, induces them to proceed with too much haste to the explanation of some difficult author, and to abandon too soon the more secure and solid way of writing exercises; which, were it pushed three or four

times as far as it is done at present, would doubtless amply repay the additional time and labour. But even with the present system, the practice of writing exercises has abridged the time formerly required for the attainment of a language probably by one-half; and what is thereby gained has properly been transferred to the study of natural philosophy, and other scientific pursuits.

This practice, if we are not mistaken, was first tried in the ancient languages, but as its advantages became palpable in a very short time, it was soon introduced likewise into the study of modern languages. Here too it was attended with the same advantages as far as regards the *reading of books;* but this not being the principal object in learning modern languages, it is evident that their acquisition has not been facilitated to the same extent as that of the ancient languages.

Those who set a just value on the knowledge of modern languages will probably regret with us that the study of these languages was not introduced before that of the ancient. It is certain that, in such an event, the teachers of the former would not for a moment have lost sight of their object. Not having before them an example to follow, they would have been compelled to find out their own way, and it cannot be questioned that they would have gone in quite a different track: after numerous abortive trials, they would doubtless have discovered a much shorter and a more efficient way of attaining their end.

We doubt not but some of the methods lately tried aimed at this object; and on that account they deserved the favour with which they were received by the public. But unfortunately they have not been able to maintain the high ground on which they were placed by public

approbation. The effect did not answer the expectations which were excited. Consequently these methods began to decline in the estimation of the public, and to be treated with neglect; and if we except a few feeble traces which still remain, we may be justified in asserting, that these new methods are almost buried in oblivion. Their downfall has of course been attended by a return to former systems.

But perhaps the modern innovations in this matter have gone too far. If, instead of abandoning entirely the old road, they had taken the pains of examining it thoroughly, they might probably have discovered, that partly by improving the road itself, and partly by straightening its windings, and cutting off some roundabouts, it was possible to bring the old road into a condition not less convenient for the traveller than favourable to his quick progress. Such an attempt at least deserves to be tried.

Experience itself must show us the way in this matter. We have only to observe the different success of different methods. Those teachers of modern languages who, from an over-anxiety to bring their pupils as soon as possible to the reading of books, or from some other motive, do not previously subject them to a course of written exercises, never succeed in imparting to them the ability of speaking the language. But it is not so with those who choose the other method. They sometimes succeed, and sometimes they do not succeed. They succeed whenever their pupils are endowed with a quick and tenacious memory, and a certain boldness of mind. But as by far the greater number of their pupils do not possess both qualities in the requisite degree, the number of those who attain such a know-

ledge as enables them to speak the language with ease, is far from comprehending the moiety of those who attempt it. How great is the number of persons who frankly declare, that they have submitted to a considerable sacrifice of time and labour for the purpose of acquiring the ability to speak a modern language, without succeeding in their design! They do not impute this failure to the want of skill in the teacher, but to the natural defects of their own memory. They are persuaded that they are well acquainted with the grammatical part of the language; but when they try to speak, they cannot find the words and expressions necessary to give utterance to their conceptions.

This fact clearly indicates where we must look for the principal fault in our method of teaching modern languages. Teachers think they have completely done their duty, if they succeed in imparting to their pupils the grammatical part of the language; and they leave the acquisition of the words, expressions, and phrases entirely to the industry of the students themselves, and to the use of a dictionary.

Now, if we consider the simplicity of the grammatical forms, and the comparatively small number of syntactical rules in all modern languages, and afterwards compare them with the multitude of words, expressions, and phrases requisite to be known before a student is able to maintain a conversation on subjects of daily occurrence, we must allow that the assistance given to the pupil by the teacher is only directed to the more easy part of the task, and that it is by far too scanty for the attainment of the object, if not seconded by extraordinary talents.

Let us see what ways have been proposed and tried

for the attainment of this most difficult part of all languages. It was once thought that the learning by heart of a vocabulary might answer the purpose. But, in our opinion, few of those who have tried the experiment have derived any considerable advantage from this most tedious task. The words and phrases are forgotten as soon as they are learned. From whatever cause it may proceed, such is the general fact; and consequently this method, if we are not greatly mistaken, is almost entirely exploded.

The knowledge of this part of the languages is much more advanced by an attentive reading of books, and doubtless it is for this reason that the teachers of modern languages employ so much time in this task. To this mode also we think it is chiefly owing that a few of their pupils acquire the ability of speaking a language. But it is insufficient for the greater number of students. That may easily be shown by referring to the ancient languages. All those who have studied them with great application know very well that even when they have advanced so far in their knowledge as to be able to translate correctly any Greek or Latin author without previous preparation, still they are unable readily to find in their memory the corresponding Greek or Latin words, whenever they try to translate the most common English expressions. Experience shows us that the case is not greatly different with those who try to acquire the ability of speaking modern languages by the reading of books.

Many teachers are doubtless sensible of the insufficiency of their methods; and in order to amend them, they try to compel their pupils to repeated efforts of speaking, by entering into some conversation with

them, but generally to no purpose: for they find two difficulties which cannot easily be overcome. The pupil is commonly too little acquainted with the expressions and phrases requisite to enable a person to maintain a conversation, and consequently it cannot be extended beyond a few commonplace or complimentary sentences; and here it must be dropped. But even if his stock of knowledge is such as would carry him through a conversation, it soon comes to a stop for want of a subject. For the circles of ideas in which both the pupil and the teacher move is so different, that it is very difficult, and in many cases quite impossible, to find out subjects of conversation equally interesting to both. Thus the honest teacher, who wishes to do his duty, after many fruitless attempts, is obliged to return to the reading of books.

Within the last few years a new method has been tried. *Dialogues* have been published. But it does not seem that this improvement has produced any considerable effect. To learn them by heart is indeed not quite so bad as to learn a vocabulary, but it is not much better. We think, however, that such dialogues may be of some service to a traveller, who has already made some progress in speaking a language, and who wishes to acquaint himself occasionally with the most common expressions on some subjects of daily occurrence. But a beginner will probably be little benefited by them.

So scanty and insufficient are the modes proposed and tried for the attainment of the most difficult part of languages, that it is evident that as long as a more efficient mode for this purpose is not devised, the acquisition of a modern language for the purpose of

speaking will always remain an enterprise in which the odds are against a successful issue for the greater number of students.

The usual mode of teaching the grammatical part of languages is much less exceptionable when it is combined with the writing of exercises. But here too we think a considerable improvement might be effected by a better arrangement of the different parts of grammar for the purpose of teaching. We do not intend to blame the order in which grammars are commonly arranged. On the contrary, we are convinced that the established arrangement is the only admissible one. But we contend, that in teaching a language the grammar is not to be imparted in that order. In teaching, the etymological and syntactical parts of the language are not to be separated. They are to be so selected and combined, that the memory of the student may find a very useful support in their union. Thus every part of grammar will be more distinctly marked, and all confusion avoided.

We leave it to the reader to judge how far all these considerations have been attended to in contriving the following improved method of teaching modern languages. It can only be called an improved method as far as regards the manner in which the grammatical knowledge is imparted; with respect to the mode adopted for impressing upon the memory the knowledge of the words and phrases, it lays claim to some novelty.

According to this method the whole plan of instruction is to be divided into three courses.

In the *first course* the formation of simple sentences is to be taught—for sentences constitute as it were,

the frame-work of each language, and phrases serve only to fill up the interstices of the frame-work. By examining a certain number of the most simple sentences, it is not difficult to make out which part of the etymology, as well as of the syntax, concur of necessity in their formation. In every language, we think the substantive and the verb are the only parts of speech which are indispensable to the formation of simple sentences, and for that reason the first efforts of the teacher are to be directed to the teaching of them, and to them they are likewise to be limited during this course. After the selection of all the grammatical parts intended for the first instruction has been carefully made, the materials are to be arranged according to the peculiarities of every language. In some the substantive, in others the verb, ought to have the precedence. In general, however, the verb may be made the leading object throughout the whole course, and whatever else is to be comprehended under it may conveniently be connected with one or the other set of verbs. After this arrangement, copious exercises for writing on every part of the grammatical instruction are to be provided. In these exercises numerous adverbs and some phrases of very common occurrence are to be inserted. This is done for the purpose of enabling the student to comprehend in a short time a great number of simple sentences used in conversation. For the same purpose about half of the irregular verbs are to be added to this course, and in the selection of them preference is to be given to those which occur most frequently.

After the exercises have been translated into the foreign language by the student, and corrected by the teacher, the work of the latter is indeed terminated,

but not that of the former. He is to be admonished by the teacher to read over the exercises from three to six times, according to the strength of his memory, and that aloud. Here it may be proper to observe, that the advantages of reading aloud what is completely understood have either not been duly appreciated, or incomprehensibly neglected, by the teachers of modern languages. As a language, when spoken, is not a science, but rather an art, the organs by which it is exercised must previously acquire an habitual skill by a long course of practice. These organs are the ear and the tongue. By reading aloud what is perfectly understood, the necessary practice is obtained. The advantages arising from this practice are greater than can easily be imagined. The translating of a set of exercises we will suppose to have required an hour; and according to the average rate of memory very little of the instruction contained in them will have been impressed upon the memory. The reading them over aloud six times does not require more than a quarter of an hour; but even students with a very bad memory will acquire by this practice the greater part of what is contained in them.

We may now reasonably suppose the student to be acquainted, not only with the manner in which simple sentences are formed, but also with a considerable number of the most current words and expressions, and with a small number of phrases; and though he does not yet know the rules on which the formation of these phrases rests, he has acquired by practice a certain facility of using them. This knowledge, if duly managed by the teacher, will in a short time enable the pupil to understand what is spoken; and to reach that

point the teacher ought now to direct all his efforts. No practice perhaps is more efficient for this purpose than that of narrating short tales. But this operation requires some particular skill in the teacher. He must adapt his narration to the knowledge of the pupil; and as the pupil is only acquainted with the formation of simple sentences, he must avoid compound ones, and substitute for them such as can easily be comprehended by the student. This can be done in every instance without impairing in the least the value of the narration itself. An instance will show how easily this may be managed.

The following tale is taken from a printed German book:—

'Zwei Bauern wurden von ihrem Dorfe abgefertigt, um in eine grosse Stadt zu gehen und dort einen geschickten Mahler zu suchen, der das Gemählde des Hochaltars in ihrer Kirche verfertigen könnte, welches das Märthyrthum des heiligen Sebastian vorstellen sollte. Der Mahler, an den sie sich wandten, fragte sie, ob die Einwohner den Heiligen lebend oder todt vorgestellt haben wollten. Diese unerwartete Frage brachte sie sehr in Verwirrung. Sie berathschlagten lange darüber. Endlich sagte einer von ihnen zum Mahler: das sicherste ist immer ihn lebendig vorzustellen; denn, wenn man ihn todt haben will, kann man ihn dann immer noch todt schlagen.'

This tale may be narrated in short and simple sentences as follows:—

'In einem Dorfe hatte man eine neue Kirche erbauet. Sie war dem heiligen Sebastian geweihet. Die Einwohner des Dorfes wollten ein Gemählde des Heiligen in ihrer Kirche haben. In der Absicht schickten sie zwei

Bauern nach der Stadt. Diese waren beauftragt einen geschickten Mahler aufzusuchen, und über den Preiss des Gemähldes mit ihm sich zu einigen. Sie fanden bald einen Mahler und fragten nach dem Preise. Den Preiss kann ich nicht sogleich bestimmen, sagte der Mahler. Ich muss erst einige umstände wissen. Erstens soll ich den Heiligen todt oder lebendig mahlen. Diese Frage hatten die Bauern nicht erwartet. Sie waren etwas betroffen und berathschlagten lange darüber. Endlich sagte einer von inhen zum Mahler: mahlen Sie ihn doch nur lebendig; denn wenn unsere Nachbarn ihn todt haben wollen, können sie ihn immer noch todt schlagen.'

It is indeed not to be supposed that the student will directly understand such tales, even when narrated in short sentences. But the teacher may, in the beginning, facilitate the understanding of them by narrating them previously in English, and likewise in short sentences, and by then repeating them, as closely as possible to the English, in the language which he teaches. After adhering to this practice in the narration of ten or twelve such tales, the teacher will find that the pupil has acquired such an ability, that he may dispense with the previous narration in English.

That from this practice of narrating tales the greatest possible instruction may be derived, the teacher has to repeat them a second time in nearly the same words, and whilst he is doing so he ought to write down all those words, expressions, and phrases, with which the pupil is not yet acquainted. Then he places this paper before the pupil, and causes him to repeat the tale in the language which he studies, and at least twice. The pupil ought then to write it down after the lesson, the teacher

to correct it, and to admonish the pupil to read it over aloud from three to six times.

This practice of narrating tales is to be continued till the student has enlarged his stock of words, expressions, and phrases, so as to be enabled to speak, which will take place in a much shorter time than may be supposed. As soon as this point is obtained, the first course of instruction may be considered as terminated.

The student will of course be very far from speaking correctly. He is still unacquainted with by far the greater part of grammatical knowledge; and till he has acquired that, his instruction is incomplete. To accomplish this is the object of the *second course*.

Here, too, the most advantageous plan will be, first, to complete his knowledge of the formation of sentences. The manner in which the subordinate sentences and the periods are formed, together with the use of the subjunctive, are to be imparted before the formation of phrases by means of prepositions, and the regimen of the verbs and adjectives can be communicated. These are things which will occupy the student for a length of time. But when the teacher knows the art of uniting the etymological forms with the syntactical rules, and of arranging matter in such a way that the following instruction is duly supported by the preceding, he will save the pupil much labour and much time.

The practice of narrating tales is still to be continued. For the new instruction ought to be impressed as strongly upon the memory as that imparted in the first course; it must even be applied with greater care, because of its more minute nature. Besides, the narration of tales gives the teacher frequent opportunities of observing those parts of grammatical knowledge in

which the pupil is not well grounded, and then he may remedy this defect by a few additional exercises. As for the mode of narrating itself, it is evident that it ought now to be changed. The use of short sentences is to be discontinued, and longer ones are to be substituted in their place. The teacher will do well to give them the average length which such sentences have in the works of the classic authors of the language that he teaches.

The farther the student advances in this second course of instruction the more he finds himself enabled to speak and write with fluency and correctness; and as soon as he arrives at the termination, he may be considered as having acquired the language. For this reason most teachers think that their task has then been brought to a completion. But we are convinced that nobody can be considered to be well versed in a language when he is not able to express his own conceptions in such forms and connexions as will adapt them to his own manner of thought and reasoning. Some persons connect their single thoughts in a very simple and loose manner; others are not content till they express, by the arrangement of their conceptions, the different relations and bearings in which they appear to their minds. Such differences in writing must necessarily influence their compositions in foreign languages; and an attentive teacher will find that some exercises are requisite to enable the pupils to follow the character of their own minds with ease and without embarrassment. These exercises form *the third course* of instruction.

Here of course the activity of the teacher must be very limited. He has only to observe the decided propensities of the mind of each pupil, and, if asked, to

point out some suitable subjects for composition. But he must proceed in this matter with great precaution, else he is in danger of pointing out the wrong way, and of increasing the labour of the student. In most cases he will do best to leave the choice of the subject entirely to the pupil. But as the facilitating of the communication between different nations is the principal object for which foreign languages are learned, the teacher is bound to insist on the composition of letters, which ought to make a principal part of this course.

Such compositions are to be looked upon as the keystone by which the arch receives its completion. With them the whole course of instruction is terminated.

It will not have escaped the attentive reader that the translation of books does not enter into this plan of teaching modern languages. The reason of this omission he will probably have guessed. It rests on the supposition, that when a student has attained the power of speaking with fluency, and of expressing with ease and correctness his own conceptions, he can find no considerable difficulty in reading printed books, especially if he takes some pains in arranging his studies in such a manner as to begin with the more easy kind of compositions, and afterwards to proceed gradually to the more difficult. By reading simple tales, novels, and comedies, he prepares himself for the more complicated style of historical compositions, philosophy, and reasoning. In poetry he ought to begin with tales and fables, then to proceed to pastorals, epic compositions, and tragedies. Didactic and lyric poetry ought to occupy the last place in his studies.

The common practice of translating books with students we consider merely a waste of time and labour,

and it ought to be completely exploded in the teaching of modern languages.

Whatever may be the advantages arising from this improved method of teaching modern languages, it has one defect. It cannot be used in large classes. We do not think that it can be made use of in a class composed of more than ten students. But as it is well known that those students who try to acquire the knowledge of modern languages in numerous classes very rarely succeed in reading even a printed book without great difficulty, and still more rarely attain to speaking the language so as to be able to maintain a conversation, we do not think that the above-mentioned defect is a great one. We doubt not that every objection to a change in the composition of classes would be removed, if it were ascertained that by such a change the students would be sure to attain that end for which modern languages are studied, and that too with less expense of time and labour.

ON THE STUDY OF THE ITALIAN LANGUAGE AND LITERATURE.

By A. VIEUSSEUX, Esq.

(From the Quarterly Journal of Education, Nos. X. and XII.)

We had intended, in the following pages, to offer some suggestions on the subject of Italian instruction in this country, in the same manner which has been followed in former numbers of this Journal with regard to French and German;* but, considering that the study of Italian is limited to a smaller class, consisting principally of persons of literary attainments and of refined taste and pursuits, classical scholars, artists, and travellers of both sexes, we think it advisable to premise a short disquisition on the present state of the Italian language and literature, and to resolve several doubts and remove some misconceptions which may exist on the subject. One peculiarity of this language has been much adverted to, especially of late years, which at first sight might appear very discouraging to the foreign student: —it has been said that "Italian—the Italian of writers and grammarians,—is not the spoken language of Italy,"—that "it is a sort of learned or dead language." This matter requires a full explanation. It is true that the use of dialects prevails over three-fourths of Italy,—

* Numbers III. and VIII. of the Journal of Education.

that these dialects are many, and that they differ, more or less, from Italian, but generally in a much greater degree than the common speech in the various counties of England differs from grammatical English. These dialects are not merely confined to rustics; they are spoken in the towns as well as in the country districts,—they are, in fact, the language of childhood of all classes of persons:—they continue to be, throughout life, the familiar language of most people, and the exclusive one of the lower orders. These dialects are not corruptions of the Italian, but are languages cognate with the latter, if not anterior to it,—they are derived from the Latin dialects which were spoken in the provinces of Italy remoter from Rome. The familiar language of the various populations of Cisalpine Gaul, of the Veneti, and of the Ligurians, under the Roman empire, was not only not the same as that in which Cicero wrote, but must have differed, likewise, from the familiar language spoken at Rome and in Latium. Each province retained part of its original idiom, whatever it might be, mixed up with that of the conquerors, the latter disfigured of course by solecisms and vulgarisms of pronunciation as it was in Rome itself*. The influx of the northern tribes who overthrew the Roman empire effected the total corruption of the spoken Latin all over Italy;—articles and auxiliaries were introduced, terminations were altered or neglected,—in short, the whole appearance of the language was changed. The

* Plays were acted in Rome in Strabo's time in the Oscan language, which still remained at that day, though the national existence of the Osci or Volsci had been extinguished.—Strabo. Casaub., p. 233. The Etruscan language also was still in use in the time of the early Cæsars.

change was, of course, greatest wherever the invaders made the longest stay and formed a permanent settlement, as was the case in Lombardy. Various dialects resulted from these various combinations, which were known by the general name of *Roman*, *Romanic*, or *Romance* language, like those of southern France.

The dialects spoken in central Italy retained a greater affinity to one another, as well as to their Latin parent. If we look at the old chronicles of the thirteenth century, written in humble, familiar style, whether at Naples, Rome, Bologna, Rimini, or Tuscany, we see a great similarity in the etymology and syntax in all. The familiar language of Tuscany, however, seems to have attained, sooner than those of its neighbours, a high degree of polish; probably it had never been so corrupt as the rest, owing to the local position of Tuscany, which prevented its being permanently occupied or colonized by the northern tribes, and also from the early independence of the Tuscan cities, their extensive trade, their wealth and civilization. In other parts of Italy, the few men of education and learning used also a language more refined than the generality of the people; and thus the early versifiers, including princes and courtiers, Frederic II, and his chancellor Pietro delle Vigne at Naples, Guido Guinicelli and Fra Guidotto of Bologna, Guido delle Colonne, a Sicilian; Can della Scala at Verona; Guido da Polenta, Prince of Ravenna, wrote in a language little different from that of the Tuscan poets and writers of the same age. But Tuscany had this advantage over the rest, that its familiar spoken language was more generally polished, so as to resemble the poetical and select language of the other Italians. And this superiority was carried still

farther in the following or fourteenth century, by the authority and example of a host of Tuscan writers, such as Dante, Dino Compagni, Cino da Pistoja, Petrarch, Boccaccio, Sacchetti, Villani, Passavanti, Pandolfini, who at once stamped the *vulgar language*, as it was then called, with the mark of Tuscan spirit and idiom.

While the oral Tuscan was thus becoming more closely connected with the written language, that of the other parts of Italy remained either stationary, as was the case at Naples, or degenerated still further, as at Bologna, and other parts of northern Italy. The people of central Italy, however, continued to understand one another; and the spoken dialects of Tuscany, Umbria, Rome, and even of part of Campania and of the Abruzzi, never varied so much from each other as those north of the Apennines. And as civilization and information spread, all the educated people of central Italy came to speak the grammatical Italian as their native language the vulgarisms of pronunciation remaining confined more and more to the illiterate, who also in some degree improved their language from the example of their betters; and thus, in Tuscany and the western Roman states, one common language is now spoken, intelligible to all the inhabitants. From the gulf of La Spezia to Terracina, nay, as far south as the Liris, and to the north as far as the central ridge of the Apennines, we have found one common language spoken and understood by all, though varying in particular districts, especially among the rural populations, by shades of pronunciation and accent, and by idioms, as is the case with the language of every country. This language is the oral Italian, bearing the same analogy to the Italian we read in the works of authors as the oral English

spoken in the various towns of England bears to the written English. The spoken Italian extends into the Abruzzi, especially in the province of Aquila and near the lake of Celano; it is also the language of the towns in the marches of Ancona, Macerata, and Fermo, as far as the Adriatic. But the rural population of these latter districts speak a sort of dialect.

Beyond the boundaries we have mentioned, north of the Apennines of Tuscany, the oral language of all classes becomes quite unintelligible to a native of central Italy, who is not always able to make himself understood, especially by the country people. The principal dialects are those of Piedmont, Genoa, Milan, Brescia, Mantua, Venice, Friuli, Ferrara, Modena, Bologna, and Romagna. Each of these states has a dialect unintelligible to the natives of most of the others, and each dialect is, in fact, a separate language, varying as to the pronunciation of town and country people, educated and uneducated, like every other language in Europe. Thus the people of Padua and Verona do not speak always exactly like those of Venice, although they all speak a common dialect, the Venetian; they all understand each other; while the people of Bergamo, Brescia, and Mantua do not understand Venetian, nor does a Venetian understand them, when each speaks his respective dialect. Most of the dialects have their own grammar and dictionary, and all of them can boast of writers, chiefly poets, many of whom excel, especially in humorous composition. At Venice, until the fall of the republic, the Venetian dialect was the language of the senate, of the bar, of the pulpit, of business of every sort. At Turin, Piedmontese was spoken by the late king Victor Emmanuel in preference to Italian or French,

which latter was then the court language. Popular plays are written and performed at Milan, Turin, and Venice, in the respective dialects, and popular preachers resort to the dialects, especially in addressing a rural audience. The same may be said of southern Italy, where the dialects of Naples, Puglia, Calabria, and Sicily prevail—with this difference however, that it is somewhat easier for a person acquainted with grammatical Italian to understand Neapolitan than Piedmontese or Milanese, because, as we have observed, the Neapolitan dialect bore originally a greater analogy to the Roman and Tuscan, and the other dialects of central Italy; and it now even bears, in point of etymology, a closer affinity to Latin than the written Italian or Tuscan. Neapolitan was the language of government under the Aragonese dynasty, and Ferdinand, the late king of Naples, talked broad Neapolitan.

After all we have said, we shall perhaps be asked, how can the written Italian of Dante, Ariosto, and Tasso be called the language of Italy? We will explain. Because it is everywhere the written language of the country, the exclusive language of epistolary correspondence, that of all refined society; it is *now*, without exception, the language of every Italian government, the language of administration, of all public acts, of the schools, the colleges, the pulpit, the bar, and of the stage, with the exception of popular farces, which are in some particular dialect. All educated men speak Italian, they learn it from their parents and teachers; all who are not totally illiterate understand it, at least for common purposes; all who can read and write, read and write Italian, for this is the only language of public and private instruction. There is, therefore, one com-

mon language for social intercourse from one end of the peninsula to the other, and he who is acquainted with it can make himself understood, at least by the people of every town, although he will not be able to understand them when speaking among themselves in their own dialect.

We have said that all educated Italians, from whatever part of the peninsula, acknowledge one common language, not only written but oral. But they do not all speak it with equal fluency or correctness. To those who are natives of the *dialect* states, Italian is not the language of the nursery; it is not the language of their youthful recreations; it is to them the language of books and teachers, not that of friends or familiars, not the language of humour, passion, or convivial mirth, nor of every-day life*. It therefore happens that even in after years, when they have occasion for familiar phrases, or technical words, they are apt either to substitute dialective phrases, or to misapply the words of the Italian. They are in a predicament somewhat similar to that of many a native of Munster or Connaught when speaking English, and the consequences are often the same—misapplication of words and confusion of sentences. We will give two instances of this as related by Grassi, a Piedmontese, in his excellent though short

* 'I was born,' says the Marquis Lucchesini, in a letter he published in the Florence Antologia, 'at Lucca, my father being from Modena, and my mother a native of Lucca. At five years of age I was taken to Modena, when, two years after, I entered college. The superiors and teachers, my brother students, the servants, all spoke Modenese, and I, with my brothers alone, spoke always Tuscan. The same thing has happened to all Tuscans who have been educated in any of the colleges of Lombardy.' Here Lucchesini alludes of course to the *familiar* language spoken by the above persons in the college.

essay on synonymes. As he was walking one day absorbed in thought through a street of Florence, he struck his foot against a stone step that projected out in front of a shop, and in the moment of pain he exclaimed, *Maledetto gradino!*—'Confound the step!' The shopman, who was looking out, with his elbows resting on the gate of his shop, cried out, 'You might better have said *scalino*, as this is not a church.' In fact, *gradino*, a diminutive of the Latin *gradus*, is a nobler word, and is used to mean steps leading to an altar or church, or other noble structure, while *scalino* comes from *scala*, and is used for common stairs. Had the shopman, however, been a philologist, he might have drawn a still nicer distinction by calling the step before his door *scaglione*. Another time, as Grassi was travelling from Florence to Siena, the coach stopped at the village of Barberino, and, on alighting, he was met by a countrywoman with a child in her arms. The child, being alarmed at the appearance of a stranger, hid its face in its mother's bosom; Grassi said he was sorry to have caused the child *paura*, 'fright;' but the mother replied immediately, *Non è paura, ma timore;* the difference between the two being this, that *paura* is caused by something frightful, and is a feeling of the senses, whilst *timore* is the offspring of the mind, and may be produced by noble causes, such as *timore di Dio*, 'the fear of God.' Now these distinctions, and a thousand more, such as *fronda* and *foglia*, *uscio* and *porta*, *superbia* and *alterezza*, &c., are felt in Tuscany by every one, from the universal habit of speaking with propriety, but, in the rest of Italy, are only understood by men of reading and philological research. No one can fully appreciate the elegance, the precision of

which the Italian language is susceptible, who has never conversed with Tuscans. In this the common people at Rome, although they have no other language than Italian, do not come near the Tuscans. A Roman would have said, correctly, *scalino* in the first instance; but, in nine cases out of ten, he would have said *paur a*, as Grassi did in the second.

It has been said that Italian *cannot be spoken correctly and quickly at the same time;* that the roundness of its periods makes it unfit for the expression of rapid feelings; that it is stiff and stilted; but we apprehend that this does not apply to the natives of Tuscany. Alfieri, a Piedmontese, in the history of his own life, pays a tribute to the superiority of the oral language of Tuscany. "We arrived at Florence, from whence we have not stirred since, and where I have found the real store-house of our language. I applied strenuously to the acquirement of the spoken idiom, and by conversing daily with Florentines, I succeeded pretty well. Then I began *to think almost exclusively* in this most rich and elegant language, which is the first indispensable condition for writing it well."

Pronunciation is another qualification in which there is much disparity between the various countries of Italy. It is not an easy thing for a native of north Italy, or of Naples, to get rid of his peculiar accent or brogue, by which he is easily distinguishable to a practised ear. The peculiarities of pronunciation are many and various in the different states. The Milanese, Genoese, Piedmontese, have in their dialects the sound of the French *u*, which Alfieri so bitterly complains of; they have also that of the French dipthong *eu*, or German *ö*, as well as the French nasals *en*, *in*, &c. These

sounds range all over Cisalpine Gaul from the Alps to the Apennines, and as far as the Rubicon, and certainly nothing can be more inconsistent with Italian euphony. The natives of the above-mentioned countries retain, in speaking Italian, something of these foreign sounds, especially the pronunciation of the *u*, of which few completely divest themselves. The Venetians are free from Gallic sounds. The dialect of the Veneti, even in ancient times, was of a different origin from that of the Gaulish tribes settled in the great plains of the Po. The Venetian dialect is the softest in Italy. The Piedmontese is softer than the Milanese or Genoese, and when spoken by men of education, and especially by females, it is even pleasing to the ear. Brescia, Bergamo, and Mantua, have the roughest dialects of Italy, with the exception of Bologna, which can boast of the most uncouth of all. In the south, the Neapolitan is pronounced broad, and full-mouthed ; it delights in liquids, and dactyles, and instead of cutting words short, like the north Italian dialects, it often adds a syllable to the termination. It has no French sounds, but it generally makes the *e* and *o* broad, and softens the sound of the *z*. Neapolitan is, upon the whole, a jovial, humorous language, and not inharmonious to the ear. It is extremely rich, especially in diminutives and augmentatives, as well as in invective and abusive expressions. The Calabrian and Sicilian are pronounced close, and abound in obtuse sounds; they change the *e* into an Italian *i*, and the *o* into an Italian *u*, thus resembling in their pronunciation the Lingua Franca spoken by Turks or Moors, who adopt the same vowel sounds, especially the *u*. Yet the Sicilian dialect is remarkably expressive, and perhaps the most poetical of all.

Although the educated natives of all these various countries do not of course pronounce Italian as they would their own dialects, yet they retain traces of dialect pronunciation from early habit, as we have already observed. As regards the ear, the northern or Lombard pronunciation is the most unpleasant; but, in other respects, all faults of pronunciation are equally disagreeable. The necessity of distinguishing between the two sounds of the *e* and *o*, as well as of the *s* and the *z*, may be better understood by looking at the numerous duplicate words, spelt exactly the same, though having totally different meanings, which can be distinguished by the pronunciation alone, for instance, *tèma*, subject, from *tema*, fear; *lègge*, he reads, from *legge*, law; *venti*, twenty, from *vènti*, winds; *mèsse*, harvest, *messe*, masses; *fòro*, the bar, and *foro*, a hole; *torta*, a pie, from *tòrta*, twisted; *ròcca*, a citadel, and *rocca*, a distaff; *torre*, a tower, *tòrre*, take away; *volto*, face, and *vòlto*, turned. Likewise *ròsa*, with soft *s*, means a *rose*, and *rosa*, with a smart sound, means *gnawed*; *mèzzo*, with the *z* pronounced soft, means *middle*, *half*, and *mezzo*, with a rough sound, means *decayed*, *rotten*. Partial lists of such words are to be found in most grammars, and some of the Italian dictionaries have lately introduced the practice of distinguishing the two sounds by particular marks, which, however, are never used by Italian writers.

All the northern dialects abound in contractions, but those of Lombardy and Bologna most of all: their words, though analogous to Italian, and derived from the same Latin parent, cannot be recognised when spoken, and not always easily when printed. But we must now return to Italian, and to its own domain, central

Italy. Here the pronunciation varies chiefly between Tuscany and Rome, besides many shades of provincial accent in the various districts of both states. We cannot award to the Tuscans, and particularly the Florentines, the same unqualified approbation with regard to their pronunciation, as we have expressed concerning the propriety of their words and the elegance of their sentences. Their guttural aspiration of the syllables *ca, co, cu, che, chi*, is certainly uncongenial to the general euphony of Italian; it is grating to the ear, and makes the Tuscan sound like Spanish. It is true that these gutturals are sounded harsher by the lower orders; that they are more marked at Florence than at Siena or Cortona, and that Tuscans who have travelled soften them considerably.

Lingua Toscana in bocca Romana is an old saying, and we believe it correct, if by it is meant the purity of Tuscan phraseology with the accent of a well-educated Roman, especially if he has resided some time in Tuscany. These two qualifications, we conceive, would bring the spoken Italian near to perfection. The gentlemen of Siena, and of the other parts of Tuscany bordering on the Roman states, as we think, come near the mark. As for the vulgar Roman pronunciation, it is drawling and incorrect. The Romans employ many familiar words different from the Tuscans, whom they consider as too finical in their choice.

Before we quit this subject, we think it may not be unacceptable to some of our readers, who may feel curious about these matters, to see some specimens of the principal dialects as compared with the Italian. The first example is taken from versions of the Ger-

salemme of Tasso, in the Milanese, Neapolitan, and Calabrian dialects.

Here is the Italian of Tasso:—

Colei Sofronia, Olindo egli s' appella,
D'una cittade entrambi e d'una fede,
Ei che modesto è sì com' essa è bella,
Brama assai, poco spera e nulla chiede;
Nè sa scoprirsi, o non ardisce, ed ella
O lo sprezza, o nol vede, o non s'avvede.
Così finora il misero ha servito,
O non visto, o mal noto, o mal gradito.—Canto ii. st. 16.

MILANESE VERSION.

Lee l'è Sofronia, e Olind l'è el so moros,
Hin tucc duu d'ona legg e patriott;
Se lee l'è bella, lu l'è vergognos,
El vorav, ma nol volza, e pur l'è cott;
Ghe batt el cœur, ghe caa el fiaa e la vos,
E lee o el le sprezza, o no la sa nagott.
Inscì sto bacal l'ha sempre servìi,
Cognossuu o pocch o minga, o mal gradii.

NEAPOLITAN.

Zofronia e Olinno ha nome sta chioppella,
Tutte dule Crestiane, edd' nno luoco;
Isso, che scornus' è quant' essa è bella,
Troppo vo, poco spera, e mmale dà ffuoco;
Nè nne sa scire, o nò n' ha core; e cchella
O nò lo vede, o sprezza, o ne sa poco.
Accossì sempe 'mplerdeto ha sservuto,
O nò ntiso, o sprezzato, o nò mmeduto.

CALABRIAN.

Illa Sufruonia, Ulinnu illu se chiama
De na stiessa cridenza e nu paise,
Illu è timitu assai, quantu illa ha fama
De bella, illu ha gran caudu e mai se ntise,
Ca nu sadi, o nu vole la maddama,
O nu sente, o nu vide, o u ne curtise:
E cussì tantu tiempu ha consumatu
O non vistu, o non ntisu, o rimuzzatu.

The following is a stanza in the Piedmontese dialect from a satirical poem of Calvo:—

E bin, mei cari fieui cosa ne dive?
I' ai fave sghignassé per doi quattrin;
Ma 'l me proget a l'era d' divèrtive
Pr feve dismentie i vostri sagrin.
A l'è pr voi-ait souì ch' i m' buto a scrive;
I parlo con j amis ch' a m' veulo bin,
E peuì se'l popolas veul criticheme
Ch' a dia lò ch'a j pias, veni nen crussieme.

Which, translated literally into Italian, would run thus:—

E ben, miei cari figliuoli, cosa ne dite? Vi ho fatto sghignazzare per due quattrini; ma il mio intento era di divertirvi per farvi dimenticare i vostri dispiaceri. L'è per voi altri soli ch' io mi dò a scrivere: Io parlo con amici che mi vogliono bene, e poi se il volgo mi vuol criticare, che dica pur ciò che gli piace, io non vò adirarmi.

The next is part of an idyll of Meli, the modern Theocritus, written originally in the Sicilian dialect, and afterwards translated into both Italian and Venetian:—

SICILIAN.	ITALIAN.
Dimmi, dimmi, Apuzza nica:	Dimmi, dimmi, Apetta cara
Unni vai cussì matinu?	Ove vai sì di mattino?
Non c'è clima chi arrussisca	Tutto è notte e non rischiara
Di lu munti a nul vicinu.	Anco il monte a noi vicino.
Trema ancora, ancora luci	Trema ancora, ancor biancheggia
La ruggiada ntra li prati	La rugiada in grembo ai prati:
Duna accura nun ti arruci	Deh! che molli io non ti veggia
L' all d'oru dilicati.	D' oro i vanni delicati.
. . . . .	. . . . .
Cerchi meli? E siddu è chissu,	Cerchi il mel? Se hai tal desio,
Chiudi l' ali; e un ti straccari;	Chiudi l' ale e non stancarti!
Ti lu 'nzignu nn locu fissu	Certo un loco so ben io
Unni ai sempri chi sucari.	Ove avrai da saziarti.
. . . . .	. . . . .

VENETIAN.

Dime Aveta bonoriva,
Perche avanzistu l'Aurora?
No gl'è ancora anema viva,
No rossiza i monti ancora;
Trema e luse in ogni parte
Su l'erbete ancora intate
La rosada; ah! no bagnarte
L'ale d' oro delicate.
. . . . . .
Vustu miel? cerchistu questo?
Sera l'ale e no stracarte,
Mi te insegno un logo presto
Da suzzarlo e sbabazzarte.

Here, but more especially in the remaining part of he idyll, the Sicilian text bears the palm for graceful-

ness over the Italian version. The following are specimens of two of the roughest dialects of Italy. The first is from a burlesque version in the language of Bergamo of Ovid's description of Chaos in his Metamorphoses:—

I nagg ch' agh foss ol mar, la terra, e 'l cil,
Nol ghera indrigg, gne invers della natura
Ma la pariva proprio un gran porcil,
Perque tugg i elemegg iera sottsura;
Ol dur col tener, e' l gros col sutil
Favan tugg quang ensem una mestura.
L' humid col sech, col fred urtava ol cald
Ol gref contro al lezer ga stava sald.

The next is a specimen of Bolognese prose:

L' e sempr stà un natural di Bulgnis, ch' quand' i vedn', o ch' i' sentn qua s' vuja cosa, a j vin subit vuja d'farla ancor' a lor; e ch al si vera, al s' è vist in temp d'la guerra, ch' tutt in dvintà suldà', e con piar geni a una nazion, o all' altra, za ch' a n' s' pseva combattr' con gli arm, a s' cumbatteva con 'l chiacr, e del volt anc d' rtopp, ch' s' 'a n i fuss stà al prigul d'fars mal, a s' srè vgnù spess' al brutt del sacc.

Which means, that 'it is the nature of the people of Bologna, that when they see or hear any thing being done, they immediately wish to do the same; and that this is the truth has been seen in the time of the war, when every one fancied himself a soldier, and took part either for one or the other of the two belligerents; and as they could not fight with arms, they fought with words, and at times too much even with these, for if it had not been for the danger of hurting each other, often they would have come to a summary decision.'

After examining attentively all the various Italian dialects we have enumerated, not merely in their written poetry, which, being the composition of scholars, approaches nearer the polished Italian, but in their familiar prose and their conversational idiom, it can be

confidently asserted, that a corrupt Latin is the basis, the main substance of them all,—a Latin already corrupt under the Romans, and afterwards still more disfigured chiefly in the spelling and pronunciation of words by the northern invaders who partly colonized Italy, but who, however, do not seem to have introduced any very considerable stock of new words. The process by which the Latin of the lower ages became Romance language can be clearly traced*, as well as the subsequent step by which the Romance was transformed into Italian. None of the dialects appear to have a foreign basis, on which Latin or Roman may have been afterwards grafted, although we should think that the aboriginal languages, especially in northern Italy, gave, in the time of the Romans, a colour to the Latin which superseded them, and some of which colour has probably been retained in the modern dialects. The difference between the dialects and the common Italian can in no wise be compared to that existing between the Welsh or Gaelic and the English; it is more like that between the lowland Scotch and the latter. There is but one dialect spoken in Italy which is evidently of foreign origin; namely, that of the district of the *Sette Communi*, or *Sieben Perghe*, near Vicenza, in the Venetian state. This small population is evidently a remnant of some one of the many northern tribes that have invaded Italy at various epochs. Some antiquarians, and Maffei and Lanzi among the rest, have fancied that they are the descendants of the Cimbri; others suppose their settlement in the country to have been subsequent to the fall of the empire. Their language is, however, of Teutonic ori-

* See No. III. of the Journal of Education, p. 38

gin, and here is a specimen of it, which we transcribe out of Mr. Rose's 'Letters from the North of Italy.' It is part of their catechism, printed at Padua in 1813:—

Moaster.	Saitar iart Christan ?
Scular.	Ia: ich pinz az Gott vorgheltz.
M.	Bas ist ein Christan ?
S.	Ar ist dear, da ist gutofet, un clobet, un professart baz de hatüz galiarnet Jesu Christo.

Here is a language essentially distinct in its etymology and form from the Italian dialects, as well as from Latin; a language which, at the bottom, is German. Compare it with any of the most uncouth dialects of Italy, those of Bergamo, Brescia, or Friuli, &c., and the difference is striking. Nay, compare with it the *Romantsch*, which is spoken in the Engadina and other valleys of the Grisons, north of the Alps, and the same difference between the two is evident, the *Romantsch* being, as its name imports, a Romance language, as well as the dialects of Italy. Here is a specimen from the Romantsch catechism. *Sensa dubt ei il Christgian la pli nobla et la pli perfetgia denter tuttas creatiras, ch'è en vegnidas ord il Tutt-pussent maun de Diu.*

Having examined the state of the oral languages of Italy, we turn to the written language, first cultivated and refined by the Tuscan writers of the fourteenth century, but neglected in the fifteenth, after the revival of classical studies. The Latin language resumed the ascendency among the learned, and the *vulgar* tongue was confined again to oral use. But its powers had been too clearly shown, and, in spite of Pomponius Lætus's advice, who dreamt of reviving the use of speaking in Latin,—a delusion akin to that of his contemporary Cola di Rienzo, who wanted to re-

establish the Roman senate and the people-king in the plenitude of their power,—the despised vulgar language soon came into fashion again in the time of Lorenzo de' Medici, who, with his friends Pulci and Poliziano, gave the example. But the cultivation of Italian was no longer confined to Tuscans. Bojardo composed his epic, and was followed by Ariosto, both natives of the Modenese territory. The age of Leo X. saw a constellation of men of genius from all parts of Italy. Rome became then the centre of Italian learning. Trissino, Berni, Bembo, Della Casa were attached to the Roman hierarchy. The courts of Ferrara, of Urbino, and of Mantua affected also to patronise genius. The first of these courts will be remembered in history as the residence of Ariosto and of Tasso. The sixteenth century was an age of sorrow to Florence, yet the expiring rays of her independence shone upon Machiavelli and Michelangelo. Afterwards, under Cosmo I. of the second house of Medici, the historians Guicciardini, Varchi, Segni, and Vasari sustained the reputation of Tuscany for letters. Bembo, a Venetian and a prelate of the Church of Rome, was the first who laid grammatical rules for the Italian language, which he called Tuscan in compliment to the great fathers of the fourteenth century. Castelvetro and Salviati entered into more minute disquisitions; the latter was the prime mover of the Academy of La Crusca, which formed itself at Florence for the object of defining the words of the language, and with this view consulted the best writers, and chiefly the Tuscan authors of the fourteenth century. The dictionary of the academy appeared for the first time at Venice in 1612, since which time four more editions have been

published with corrections and additions: the last was that of 1729-38, Florence, 6 vols. folio, with another volume folio of additions, or Giunta, published in 1751. A more compendious edition was published by Cesari at Verona in 1806, 6 vols. 4to.

The luxuriant growth of Italian literature in the sixteenth century did not, however, strike firm root in the soil: its productions consisted chiefly of poetry and works of erudition; and although several writers, such as Della Casa, Annibal Caro, Bembo, Bonfadio, Doni, wrote familiar letters and essays, and Bargagli, Bandello, Erizzo, Firenzuola, wrote entertaining tales, yet jthe language was generally too ambitious, or the subjects not sufficiently popular. Italian was not, except in Tuscany, the common language of every one; dialects were spoken over three-fourths of Italy, and Latin was every where the language of science and the schools; and at Rome, where the people spoke Italian, the court and hierarchy wrote in Latin. Hence the written langnage could not become national, and this was a serious evil, the consequences of which were felt in the sequel.

In the seventeenth century, an age of political degradation for the greater part of Italy, which was subject to the delegated power of Spanish viceroys, at a time when Spain itself was falling fast into decay, the written language and literature declined; the writers, both in prose and verse, were vitiated in their taste; they adopted a turgid style; and carried the abuse of metaphors to a most extravagant degree. Yet even that century was not without its luminaries. The poets Chiabrera, Guidi, Maggi, Tassoni, Filicaja, and Menzini: the philologists Redi and Salvini; the historians

Bentivoglio and Davila; the great Galileo;—all these, and others whom we could mention, wrote in good language, and they are accordingly numbered among the authorities by the Crusca, as are likewise the famous Sarpi and his antagonist Cardinal Pallavicino, with the Jesuits Segneri and Bartoli, although inferior in their style, and somewhat vitiated by the prevailing bad taste of that age. In short, we ought not to adopt blindly the hackneyed epithet of *Seicentisti*, as a defamatory appellation applied to the writers of the seventeenth century in general. The school of Marini was bad enough, but it did not extend all over Italy, and it soon declined in its influence through its very absurdities.

In the eighteenth century, Italy was again restored to a sort of nationality; she had resident sovereigns, who effected useful reforms and encouraged learning, and letters and science felt the effects of the general revival. The writers of this age were investigators, philosophers, sound critics; and the names of Giannone, Vico, Genovesi, Filangieri, Beccaria, Baretti, Muratori, Maffei, Pietro Verri, Carli, Lanzi, &c., bear witness to the change. But the language, far from participating in the progress of the mind, degenerated still; writers became careless of their style: they introduced foreign words and diction. The causes of this anomaly were various. The recent splendour of the French literature in the age of Louis XIV., and the fashion that made French a sort of continental language, owing, in some measure, to the greater simplicity of its construction, which rejects inversion; the intercourse between France and Italy; the scientific, political, and philosophical works of the eighteenth century,

which were also produced in France, and the popularity of the new ideas they imparted,—all these, added to the previous decay of the spirit of Italian literature during the seventeenth century, made the studious and the curious turn to France, read and quote French books, and translate French works into a sort of slovenly Italian. The effects of this became apparent not only in the introduction of foreign words, to which a mere Italian termination was given, but still more in the construction of sentences, and in the adoption of foreign phrases and idioms. 'We have been inundated,' says the late Cesari in his dissertation on the state of the Italian language published in 1809, 'by a quantity of bad translations from the French, in which the syntax of that language and all its peculiarities of idiom are preserved, most of the words having nothing of Italian except the termination. We have numerous treatises on the natural sciences, even those now used in our schools, among which I cannot find one whose language bears the least mark of Tuscan idiom and Tuscan spirit. And this, not because we want good words to express scientific objects and ideas,—for it is easy to prove the contrary by referring to the works of Passavanti, Crescenzi, Galileo, Redi, Aldobrandini, Montecuccoli, Bartoli, and the numerous works on agriculture, on the medical sciences, &c., all written in pure language; but because the modern compilers of scientific treatises, being, *like most men, inclined to save labour*, would not take the trouble of consulting the old writers or the dictionary, but found it a shorter and easier task to coin new words out of the foreign works from which they took the matter of their dissertations.'

Among the literary men, several, such as Zanotti,

Manfredi, Gasparo Gozzi, Varano, opposed the prevailing corruption, which spread most widely in the spoken language. Young men, natives of the dialect states, instead of applying to the study of the written Italian, preferred learning French, as was then the fashion, and many were found, especially in the north, speaking good French, who could not put together ten words of correct Italian. The greater number, however, spoke bad French and worse Italian, or rather no Italian at all, but a mixture of French, dialect, and Italian words. Alfieri, Parini, Foscolo, and other truly national writers living at the close of the 18th century, complain bitterly in their works of the degradation of the language. There were, however, some men of learning and talent who encouraged the corruption. Among these, Bettinelli and Cesarotti were most conspicuous. Both were imbued with the current French literature of the time, and preferred Voltaire's epigrammatic sentences to the more round and sonorous Tuscan period. But this was not all. Bettinelli, a Jesuit, after writing a good work 'On the Revival of Letters in Italy after the Dark Ages,' attempted lighter compositions both in prose and verse, in which he introduced a redundancy of adjectives, a profusion of images, a minuteness of description, which serve but to reveal the sterility of thoughts in the writer's mind. He also assailed Dante and Petrarch, but especially the former, whose powerful and comprehensive genius seems to have excited in him a sort of hatred; he even said that there were hardly three hundred lines good for anything in the whole Divina Commedia. And poor Bettinelli after this had the modesty to propose his own insipid blank verses, those of Frugoni, and some of

Algarotti, (the latter, however, openly disclaimed all part in this transaction,) as models, and had them published under the title of 'Blank Verse of three excellent Poets.' 'Bettinelli and Roberti,' says Foscolo, 'were at the head of the Jesuitic school, who, being fond of novelty, and yet wishing to avoid gallicisms, loaded their compositions with a thousand useless artificial flowers, and indulged in truncated terminations, especially in the plural number. Roberti was compared to a silvered snail, who leaves wherever he passes tracks of tinsel.' At last Cesarotti came, and he, through love of singularity, and in hatred of the supremacy of the Crusca, openly favoured the introduction of gallicisms. Cesarotti was a scholar, imbued with classic lore, and yet he affected to prefer Ossian to Homer; he was well acquainted with the Tuscan and other good writers of the fourteenth and sixteenth centuries, whose style he has even occasionally imitated, and yet he introduced neologisms and French constructions in his works with greater licentiousness than any who had preceded him. He may be considered as the champion of the Gallic school in the Italian language, as well as of the romantic school in taste and composition. In his philological works, his theory is that of a reasonable liberty in matters of language, but in his own practice he wantonly abused the privilege he claimed. His biographer, Ugoni, justly remarks, that 'an innovator who rises in the midst of a city stationary in literary studies (Cesarotti was a native of Padua, where he studied, and where he afterwards became the professor of the Greek and Hebrew languages) often turns out like the prodigal son of a miser. In both cases the aversion and disgust occasioned by the ex-

ample of one vice leads to the adoption of the opposite extreme.'

In order that the Italian student may better understand the difference between what is considered good language in Italy, and the slovenly foreign style which began to prevail in the last century, we will transcribe from an excellent little work of Costa, "On Italian Elocution," a short extract of two versions of Livy, one by a writer of the fourteenth century, a contemporary of Dante, and the other by a north Italian professor of our own age. We will mark in italics the obnoxious words or phrases in the latter, as noted by Costa:—

LIVY'S TEXT.	OLD TRANSLATION.	MODERN ONE.
Regii quidem juvenes interdum otium conviviis commessationibusque inter se terebant.	I figliuoli del re facevano tra loro festa e sollazzo di mangiare e di bere, ed ora nel padiglione dell' uno ora dell' altro.	La gioventù *che apparteneva alla reggia* se la passava sovente banchettando, convitando.
Forte potantibus his apud Sextum Tarquinium, ubi et Collatinus comabat Tarquinius, Egerii filius, incidit de uxoribus mentio. Suam quisque laudare miris modis: inde certamine accenso, Collatinus negat, verbis opus esse; paucis id quidem horis posse sciri quantum cæteris præstet Lucretia sua. Quin, si vigor juventæ inest, conscendimus equos, invisimusque præsentes nostrarum ingenia? Id cuique spectatissimum sit, quod nec opinato viri adventu occurrerit oculis. Incaluerant vino. "Age sane:" omnes. Citatis equis advolant Romam. Quo quum, primis se intendentibus tenebris pervenissent, etc.	Una sera essendosi ragunati nella tenda di Sesto Tarquinio, Collatino figliuolo di Egerio, mangiando con loro, elli cominciarono a parlare delle loro mogliere; ciascuno pregiava la sua maravigliosamente, onde gran contenzione e prova si levò trà loro. Qui non ha bisogno di parole, disse Collatino; in poco d'ora possiamo sapere come Lucrezia mia mogliе avanzi tutte l' altre di pregio. Sagliamo, diss' egli, a cavallo, e andiamo a Roma e sappiamo che opere fanno le nostre femmine, e quella sia la più pregiata che in miglior opera sarà trovata, quando ella non avrà niente saputo della venuta di suo marito. Elli erano caldi di vino, e senza indugio montarono a cavallo e andarono correndo a Roma. Quando vi furono giunti, cominciò a far notte.	Cenando essi per avventura *presso* Sesto Tarquinio, dove era intervenuto anche Collatino Tarquinio, figlio di Egerio, il discorso *cadde* sulle mogli. Esaltava ciascuno la sua in modo maraviglioso. *Infiammatasi la disputa* Collatino sostiene che non v' ha bisogno di parole, che in breve ora si può sapere di quanto Lugrezia *sorpassi* tutte l' altre. Siamo giovani e forti, perchè non montiamo a cavallo, e non andiamo noi stessi *a riconoscere la condotta* di nostre donne? *Ritenga* però ognuno per fermo e dimostrato ciocchè verrà a cadergli sott' occhio nel non pensato ritorno del marito. Eran caldi di vino, e gridan tutti; andiamo; e *volano* a Roma *di pien galoppo:* vi giungono sull' imbrunir della sera.

The invasion of Italy by the French in 1796, and its subsequent occupation by them till 1814, sunk the Italian language to the lowest point. It really seemed at one time as if that beautiful idiom was becoming extinct. In the greater part of Italy, absurdly annexed to the French empire, which included Piedmont, Genoa, Parma, Piacenza, Tuscany, and Rome, French was the language of the rulers, of the chief officers and magistrates, the language of the bar, the official language in short, and consequently the forced one of refined society. At last, in March, 1809, a decree of Napoleon allowed the Italian language to be used in Tuscany conjointly with the French in pleading, as well as in legal documents, &c. He also allotted an annual premium to the best work in Italian. But this solitary encouragement had little effect in counteracting the whole tendency of his system. In Lombardy and the Venetian states, which were designated by the high-sounding appellation of Kingdom of Italy, Italian was the acknowledged language of government, but French influence and fashion were paramount; French decrees came from the emperor's cabinet; the viceroy was a Frenchman; a French army was constantly stationed in the country; French was the language of *ton*. The same happened in the kingdom of Naples; there was a French king and queen, a complete French court; French superior officers, civil and military; a French stationary army; and the Neapolitans learned to talk broken French in preference to Italian. Italians in general do not excel in their pronunciation of French, and the Neapolitans are especially awkward in the diphthongs. It was during that epoch of moral servility that the most barbarous neologisms were introduced,

not because Italian words were wanted, but because young men, ignorant of their own language, adopted the words of their French masters, which had become familiar to their ears. Then such words became current as *arrangiare* for *porre sesto*, *arrivare* for *accadere*, *paralizzare* for *sospendere*, *vidimare* for *contrassegnare*, *disorganizzare* for *sconcertare*, *abbonarsi* instead of *associarsi*, *debordare* for *traripare*, *percezione* instead of *riscossione*, *trattamento* instead of *onorario*, and a crowd of *chittanze*, *restanze*, *ammonti*, *rinvii*, *funzionarj*, *contabilità*, *burò*, *borderò*, *rapporti*, *redattori*. *riviste*, and the verbs *energizzare*, *rivoluzionare*, *democratizzare*, and such like, with which the newspapers and political pamphlets of the republican period were spangled; and also phrases, such as *vengo di dirvi*, *sul campo*, *mettersi in rotta*, *senza ritorno*, and a thousand other barbarisms of this sort, the meaning of every one of which could have been rendered by sound and plain Italian words, to be found in almost every author, and in every dictionary. A bastard jargon was thus formed, neither Italian nor French, but which resembled rather the *Lingua Franca* which is used in the harbours of the Levant and on the coast of Barbary; and it was not only spoken, but written and printed in the public documents, and even in the legislative enactments of the newly-created governments. The minister of the interior of the kingdom of Italy, Count Vaccari, wishing to place some restraint on this abuse, induced a man of letters to compile 'an index of words commonly used, which are not in the Italian dictionaries,' which was printed at Milan in 1812.

Peace came, and with it the evacuation of Italy by the French. The restored governments, whatever their

other deficiencies may be, are at least Italian, with the exception of that of Lombardy. But even in the latter, the total dissimilarity between the German and the Italian tongues, and the little sympathy existing between the two people, prevents any corrupting influence being exercised by the former ; and the language of the administration, of the judicial courts, and of the schools* continues to be the Italian. Indeed, the love of the national language, almost extinct under the French, has revived to a wonderful degree since the peace. Throughout the preceding period, a few men of genius and honest sentiments had stemmed the current; Parini, Foscolo, Pindemonte, Alfieri, and Monti: the two last, especially, professing themselves disciples of Dante, the great father of Italian literature, who had lain nearly forgotten for centuries past. Their example encouraged others to study the Divine Comedy. Then came philologists and sound critics, who showed the beauties of the Italian, and made their countrymen ashamed of the slovenly jargon that was substituted for it. Such were Napione, Cesari, Lamberti, and Giordani. All these, it may be remarked, were not Tuscans ; they were North Italians; and it is from Lombardy that the impulse was given. Gallicisms, both of etymology and syntax, were unanimously condemned and hunted out : *peccavimus* was said with regard to past errors, and in this salutary reform Italians of all parties, and of every state, from Turin to Calabria, agreed. Italian was again the language of all the restored go-

* See Nos. V. and VI. of the Journal of Education, about the schools established by the Austrian administration in Lombardy, one of the principal objects of which is instruction in the Italian language.

vernments, and, what is more, the language of public instruction throughout the Peninsula. But now the old dispute about Tuscan purism and supremacy was revived, and it gave rise to a long, bitter, and voluminous controversy. The attack was, we believe, begun by Monti, who adopted, in some degree, the opinions of Cesarotti, without, however, imitating the extreme neologisms of that writer. This question, between Monti and his son-in-law, Perticari, on one side, and the Tuscans on the other, assumed at first the character of a mere philological problem; viz., whether the written Italian, or *lingua illustre*, has ever been the spoken language of any part of Italy, or whether it was first used in writing by the Tuscans alone, or by writers from various parts of the Peninsula at the same time? We have already said something on this subject; we consider that the language of Dante, Petrarch, and Boccaccio, was never exactly the language of the common people in any part of Italy; but we believe, that, of all the spoken idioms, that of Tuscany resembled it most at the time. That idiom has somewhat altered since, and yet, after a period of five centuries, it still resembles the language of those great Tuscan writers more than any other Italian dialect. We here mean the Tuscan as it is spoken by men of some education, and not the common idioms of some particular districts, which might be compared to our London cockneyisms and vulgar slang phrases. Even in the city of Florence the language of the Camaldoli is full of solecisms. The oral language of Rome stands in a similar predicament. It became refined later than the Tuscan, for this reason, that it remained longer confined to the

vulgar, the court and hierarchy retaining the use of Latin. And yet the life of Cola di Rienzo, written in a familiar style by a contemporary of this tribune, is quite intelligible to all who understand the written Italian. Since the age of Leo X., however, all educated Romans speak grammatical Italian as their native language, and the solecisms and vulgarisms which the lower class still retain, are hardly sufficient to constitute a separate dialect. The songs and ballads of the peasants of the Campagna, some of which have been lately collected and published,* are pure Italian. Rome and Tuscany are, therefore, the two countries where the spoken language can be called Italian, as it bears the same resemblance to the written Italian that the oral language of Paris or London does to the written language of France or England.

But another and a more practical question derived from the preceding is, whether Italian writers ought to follow exclusively the Tuscan authors of the fourteenth century, the *golden age*, as it is called, of the language. We, for our part, should say,—imitate them in the choice and proper application of their words, as far as they can supply them; but with regard to their turn of phrases and their idiomatic sentences, we think some discrimination is required. We ought first to distinguish between the poets and the prose-writers. Among the former, Dante and Petrarch will always continue to be models in their respective walks. Dante, above all, is the great master, the universal Italian rather than

* Saggio di Canti popolari della Provincia di Marittima e Campagna. Edited by the Cavaliere P. E. Visconti, Roma, 1830.

Florentine poet, for he took his words from the various dialects of Italy. Among the prose-writers, Boccaccio has been extolled by many as the first, the only master. The elegance of his language and the choice of his expressions are wonderfully great; but his mode of construction cannot serve as a general model for all kinds of composition. He often indulges in the Latin or Ciceronian period, more than is congenial to the nature of the Italian language, more than can be borne by the active temper of modern elocution. How can a long period, thickset with a forest of articles unknown to the Latins, read smoothly with the governing verb at the end? The turn of Boccaccio's sentences was studied; it was certainly not that of familiar conversation even in his time. The historians, however, of the same date furnish a less ambitious and more fluent style. Dino Compagni, Villani, and, at a later period, Machiavelli, the greatest of all, rejected the inverted order, and wrote a pure current Italian prose. So did Passavanti and Cavalca, and the novelist Sacchetti, who writes as his countrymen spoke. There are, therefore, various models for various sorts of Italian prose-composition. We shall quote here the words of Niccolini, from a discourse which he delivered in 1821 before the academy of La Crusca, that academy which has unjustly been accused of being the holy inquisition of Italian literature: "Let our writers employ, above all, clear determinate expressions, understood by all, spoken and written by many; let them avoid pedantry, as well as licentiousness; let the rules of our language be unto them as a bridle, and not as a chain; let us avoid the error of our fathers in the last century,—who bestowed all their attention on the subjects about which they

wrote, and not on the words in which they clothed their ideas,—as well as the copious verbosity of others, by which it has been observed that the patrimony of human knowledge has not been enriched by one single thought." On the other side, Perticari himself says: "Had we been living in the thirteenth century, we might have freely borrowed words from all the dialects, and thus have enriched the written language which we contributed to create; but the language is now formed, and we cannot make it anew. We may add some new names of objects or ideas unknown to our fathers, and we must consult for this purpose the writer, whether Neapolitan or Milanese, Florentine or Roman, who has first made use of them; but we must not capriciously alter the meaning of words, or substitute alien ones for those already received." Thus men of judgment, when speaking calmly and with honest purpose, generally some nearer each other in their conclusions than they themselves would have supposed at the outset.

And in fact, if, as the more exaggerated purists pretend, no one can speak or write correctly, unless he has drunk in youth of the waters of the Arno, or at least unless he has long resided on the banks of that stream; it follows that the rest of the Italians ought not to attempt to write at all, and that Tuscany must remain in single blessedness separated from the rest of the peninsula. But these are not the sentiments of enlightened Tuscans. On the other side, we must not judge of the Tuscan language from the caricatures of it that have been drawn by Goldoni and others, who represent the Cruscante as a pedantic, absurd-talking being.

We have expatiated at some length upon these philo-

logical questions, because students of Italian cannot fail, especially if they should travel into Italy, to hear and read much about this controversy, and they might be puzzled and disheartened by the exaggerations of the more violent zealots of either party. Italian is a language that requires to be studied assidnously, in order that one may perceive its power and its beauties. The best scholars of Italy, men grown old in philological studies, have acknowledged that the longer they have laboured at their own language, the more they have discovered its capabilities, and the elegance, and at the same time the precision and strength, of which it is susceptible. We are of opinion, that no writer has yet exhibited all these powers in their fulness. Nor do we think that the zeal with which questions of language have been discussed by the Italians of late years, although carried sometimes beyond the verge of sound philosophy, is either misplaced or useless, for the subject is to Italy a matter of high importance in a national point of view, as no people without a common language can ever rank as a nation.

The field of Italian literature is much more extensive than is generally supposed. We have mentioned a few of the most distinguished writers of various ages; but for the rest we must refer to the numerous bibliographers, to Tiraboschi, and to Lombardi, the continuer of his work, to Fontanini, Crescimbeni, Gamba, &c. We may, perhaps, in a future part, give a critical list of the best grammars, dictionaries, and other works which may afford valuable assistance to students. The English have, until lately, derived their notions about Italy, the Italians, and their literature, chiefly through French channels, a medium not always to be depended upon.

It is time that every nation should be heard in its own cause. No one ought to form a judgment of matters connected with other countries, unless he has referred to the best native authorities. It is a common error, derived from political exaggeration, to suppose that the Italian mind has been asleep ever since the restoration of 1815. Never perhaps was there a period during which it was so active. The presses of Milan, Pavia, Padua, Venice, Turin, Florence, Rome, Naples, and Palermo, bring forth every year numerous works, of which very few ever cross the Alps, or are known even by name to foreign critics. Almost every town of Lombardy has its presses employed. We might refer to the pages of the Biblioteca Italiana, and to those of the Antologia of Florence, the two best literary journals of Italy, where monthly lists of the new publications are to be found. But these lists do not include by far the whole of the new works. Many books are published in southern Italy, at Naples, and in Sicily, which are hardly ever known, even by name, at Florence or Milan. The want of security for literary property is a great evil. As soon as a work of any attraction is published in one of the Italian states, reprints of it appear in others. This is to writers and booksellers a more severe check than even the censorship; yet in spite of these discouragements, Italy has produced during the last twenty years excellent works of history, biography, classical learning, and illustration of the arts, as well as books of travels, historical novels, essays, descriptive sketches, in short all the materials for an entertaining library, in which Italy was before rather deficient; likewise good works on science, jurisprudence, public economy, besides an immense number of new and correct editions

of former writers, and especially of the chronicles of the middle ages, to which we see with pleasure the Italians have turned their attention, for in them are to be found the true elements of modern Italian civilization and nationality. Among the original works, we will mention a few that occur to us now; Micali's Italy before the Roman dominion, Pignotti's excellent History of Tuscany, Botta's important History of Italy during the French invasions and late occupation of the country, and again his recent continuation of Guicciardini, Cicognara's History of Sculpture, Ferrario's History of Chivalry and Romance, Litta's splendid biographical and archæological work on the great Italian families, Inghirami's Etruscan Antiquities. Among the jurists and political economists, Romagnosi, Gioja, Tamburini, are illustrious names. The plays of Nota and Giraud; the tragedies of Pellico, Manzoni, and Niccolini, are justly admired. Manzoni has given Italy the best, we may say the first, historical novel she ever had, and numerous writers have now followed the same career. Della Cella, Brocchi, Raddi, Breislak, Rosellini, have published their travels undertaken for objects of learning or science. Of poets and philologists, Monti, Foscolo, Pindemonte, are lately dead. Among scientific men, Vaccà, Piazzi, Volta, Scarpa, Oriani, are also departed. But Aldini, Brugnatelli, Configliacchi, Ferrara, Conti, and Mai are living. All the above names, and we have only mentioned those most generally known, afford a sufficient refutation to those who pretend to say, that Italy is "the land of the dead." There exists considerable difficulty in England in procuring new works from the various parts of Italy; there is, however, one

Italian bookseller in London, Rolandi, of Berners Street, who keeps up a correspondence with the principal houses of Milan and Florence, and is pretty regularly supplied with most of the new works from the Italian press.

ON THE STUDY OF THE ITALIAN LANGUAGE.

(From the Quarterly Journal of Education, No. XII.)

We promised in a former Number* to offer some suggestions to students of Italian in this country, with respect to the method of learning that language, and also to give a list of the best grammars, dictionaries, and other works, which may afford assistance. We cannot enter here into an elaborate grammatical dissertation; we shall merely make such remarks, and offer such hints as have occurred to us at various times.

The first thing is to acquire a good pronunciation. For this purpose it is requisite that the teacher, if not a native of Tuscany or Rome, should at least be familiar with the pronunciation of educated people in those countries, as we have already explained in our former article; and that he should pronounce, for instance, the letter *u* full and round, like the English *oo;* that he should be exact in discriminating between the two sounds of the *e* and of the *o*, as well as those of the *s* and the *z;* and also in pronouncing the syllables *ce* and *ci*, which ought to be sounded as the English *ch*, though somewhat more softly; the *sce*, *sci*, which latter have the sound of the English *sh* in *shame*, *shin;*

* No. X. of the Journal of Education, p. 265.

the *gl*, which is pronounced as the French *il* in *bouilli*, and the *gn*, which sounds as in French in the word *Espagne*. These we consider as the principal tests of Italian pronunciation, and the student himself will soon discover, by referring to a good grammar, such as that of Galignani, edited by Montucci, Lecture I., whether his teacher is deficient in any of these requisites. Let him not, however, carry his suspicion and fastidiousness to extremes, for he will find many well-educated Italians, and such most Italian teachers in this country certainly are, who are acquainted with the proper pronunciation in all the above cases, and who yet in common conversation occasionally deviate from it. If the pupil feels any doubts in some particular instance, he ought to call the attention of the teacher to the point, so as to define at once the proper sound of the word, which when acquired he will not easily forget. Of the aspiration by the Florentines of the *ca*, *co*, *cu*, *che*, *chi*, we have already spoken, and we can only add that it ought to be avoided. Montucci remarks that this habit is very ancient, and occurred in the Latin language, as appears by the epigram :

> Chommoda dicebat, si quando commoda vellet
> Dicere, et hinsidias, Arrius insidias.

Arrius must have said *cho*mmoda, exactly as a Florentine would; and *hin*sidias, like a modern vulgar cockney.

The pronunciation of Italian is not difficult to acquire by natives of England. It is much easier for them to pronounce Italian than French. We have known persons read Italian pretty correctly after one or two lessons. The greatest difficulty is in the accent, of which there is one, and only one, in every polysy-

labic word. The stress is laid on the accented syllable by raising the voice. The Italian accent is seldom written, except when it falls upon the last syllable of a word where it is marked (`); the Italians having adopted the grave accent for terminations, and reserved the acute for the middle of words. The accents do not, as in French, mark the broad or close pronunciation of the vowel itself. In the middle of words, the accent is used only where it is necessary to avoid ambiguity; as *balìa*, 'power,' to distinguish it from *bália* 'nurse,' in the latter word the accent being on the first *a*. Some monosyllables are written with an accent for the same reason: *dì*, 'day,' as distinguished from the preposition *di*, 'of.' Likewise *piè*, 'foot,' is distinguished by the accent from *pie*, plural of the feminine adjective *pia*, 'pious,' and *già*, 'already,' from *gia*, a poetical word, signifying 'he went.' In these cases the accented word is invariably a monosyllabic diphthong, whilst its non-accented *double* may be counted in poetry as two syllables: pi e, gi-a. The first class of diphthongs are called *raccolti*, in which the first vowel is hurried over, and is less discernible by the ear than the latter; and the second class are called *distesi*, in which both vowels are equally sounded in pronunciation.

In dissyllables there can be no difficulty about the accent, for unless it is written on the last syllable, it lies necessarily on the first. But words of more than two syllables are often perplexing to a foreigner. Most dictionaries now, however, have the accented syllable marked.

We would advise the student to make his teacher read to him loud and slowly separate Italian sentences, with the proper accent and intonation, and he should

then repeat them after him until he can imitate him perfectly. From a short sentence he ought to pass to a long period, and lastly to a whole paragraph of good Italian prose, such as Villani or Machiavelli. This exercise ought to be frequently repeated; and in the absence of the master, the student ought to repeat aloud to himself the same paragraph. Indeed, reading aloud is a useful practice that ought to be repeated often, and persevered in. The ear cannot be too soon accustomed to the sound of foreign words and foreign periods. This is particularly important with regard to Italian, a language of which harmony is so essential an element, and which becomes absolutely odious when spoilt by bad pronunciation and bad intonation.

Italian orthography is perhaps the easiest of any language in Europe. There are no mute letters, except the *h* in a few words; the vowels have each a distinct sound; the diphthongs retain the pronunciation of each of their component parts, and do not, as in French or English, produce a third sound different from both; in short, it is hardly possible for a person who hears an Italian word distinctly pronounced, and is familiar with the Italian alphabet, not to be able to write it correctly. Consequently, we do not meet with so much bad spelling among the Italians, as among other nations. A good ear is in most cases a sufficient guide. Writing under the dictation of a teacher is a very useful exercise for a beginner.

With regard to Italian grammars, of which the number is almost countless, both in French and English, all have some good parts in them, as well as many deficiencies. We would recommend at first a concise one, such as the *little one* of Biagioli, entitled *Grammaire*

Elémentaire à l'usage de la Jeunesse, 12mo., or the one of Vergani, edited by Piranesi. Bating his conceit, Biagioli was certainly one of the best Italian teachers in our days; but there is no occasion to follow him all the way in his favourite theory of the ellipsis, which he carried to a ludicrous extent. Galignani's 'Twenty-four Lectures on the Italian Language,' revised and edited by Dr. Montucci, we have already mentioned. Although not a complete grammar, it has some parts very complete, especially Lectures XI. and XII., on the intricate subject of the conjunctive pronouns or affixes, which deserve to be attentively studied. In the 18th Lecture also, there is a very useful table of the various auxiliaries which can be used with Italian verbs, corresponding to the English idioms:—'I am (doing a thing), I must or ought to, I am going to,' &c. The reader, on perusing this table, with the accompanying remarks, will have an insight into some of the capabilities of the Italian language as to precision and variety of expression. *Egli stava parlando*, *ei veniva parlando*, *egli andava parlando*, all convey different meanings, while *egli stava per parlare* varies in degree from *egli era per parlare;* the first meaning 'he was on the very point of speaking,' and the second merely 'he was going to speak.' *Si fece a parlare*, 'he began, or set about speaking,' &c.

The diminutives and augmentatives furnish an almost inexhaustible store of Italian words; but we would caution the student against making use of them too freely, as the propriety of their application depends chiefly on custom and euphony, of which a foreigner can hardly ever be a competent judge. To show the variety of diminutive and augmentative affixes of which

some nouns are susceptible, we will quote *ragazzo*, 'a boy,' from which are made *ragazzino*, *ragazzetto*, *ragazzello*, *ragazzuccio*, *ragazzotto*, *ragazzone*, *ragazzaccio*; and the compound ones: *ragazzellaccio*, *ragazzettuccio*, *ragazzettino*, *ragazzonaccio*, &c. Each of these expresses a different qualification or attribute: *ragazzetto* is merely a little boy, *ragazzino* a delicate little boy, *ragazzello* a common little boy, *ragazzone* a great boy, *ragazzotto* a stout boy, *ragazzuccio* a tiny little boy, *ragazzaccio* a good-for-nothing boy, &c. Some of the above affixes are applied to both substantives and adjectives, others to adjectives only, as *verde*, *verdigno*, green, greenish; *rosso*, *rossiccio*, &c. Others have a collective meaning, such as *legna*, *legname*; *agro*, *agrume*; *alberi*, *albereto*; *concia*, *concime*, &c. Some can only be used with particular nouns, as *casa*, *casupola*; *libro*, *libercolo*; *medico*, *medicastro*; *cane*, *cagnazzo*. We can say *vecchiarello* but not *vecchiello*, *donnetta* but not *donnella*, *bastoncino* and not *bastonetto*. Euphony and propriety in the association of ideas are the principal guides in these matters.

The vast field of derivatives has been yet hardly examined by grammarians. Many derived words, having a common termination, imply the same modification of the meaning of their respective radical, for instance, *ferrajo*, *sellajo*, *materassajo*, *vasajo*, *calzettajo*, &c., mean a dealer in, or workman of, the article expressed in the first part of the word, namely, ironmonger, saddler, &c. A numerous class of nouns derived from verbs end in *tore*, *amatore*, *feritore*, *ingannatore*, &c. Others in *abile*, *ando* or *ivo*, *esecrabile*, *esecrando*, *nociro*. A large class of adjectives are formed from substantives by adding *oso*, *amore*, *amoroso*, *paura*, *pau-*

roso, &c. A knowledge of Latin will greatly assist the student in the formation of these derivatives. Most substantives derived from adjectives end in *tà*, *za*, *zia*, and *udine*: *probo*, *probità*; *prudente*, *prudenza*; *stolto*, *stoltezza*; *pigro*, *pigrizia*; *mansueto*, *mansuetudine*. But the real formation of the Italian nouns is seen better by comparing them with the corresponding Latin. Thus nouns in *tà* come from Latin words in *tas*, as *probitas*, *probità*: those in *za* from terminations in *tia*, as *prudentia*, *prudenza*, and so on. We merely throw out these hints, of which the student may avail himself, by classing words according to their termination, and thus becoming acquainted with whole families of them at once. Also in learning a new verb, it is well to find out all the substantives and adjectives as well as the adverbs, that can be derived from it; as *consolare*, *consolatore*, *consolatrice*, *consolante*, *consolabile*; *abbominare*, *abbominevole*, *abbominando*, *abbominoso*, &c. All these terminations cannot be affixed to every verb indiscriminately; that in *ando* is used in comparatively few cases, and that in *abile* changes in some verbs into *evole*, and in others into *ibile*. *Esortare* makes *esortatore*, *esortatrice*, *esortazione*, *esortativo*, *esortatorio*, *esortatoriamente*, *esortabile*. From *arrendere* are made *arrenditore*, *arrenditrice*, *arrendimento*, *arrendevole*, *arrendevolezza*, *arrendevolmente*, *arrendibile*, *arrendibilità*.

One of the difficulties in the Italian syntax consists in finding out the preposition required between a verb and the following infinitive. The English have generally little difficulty in their own language, in which the particle *to* answers the purpose in most cases. In Italian, it may be either *di*, *a*, *per*, or *da*. *Vi pro-*

metto di farlo. Non pensa à far cosa alcuna. Viaggia per istruirsi. Urla da fare assordire. In this respect the Italian construction resembles the French, excepting the *da,* the use of which is peculiar to the Italian language. Again, the case after the verb, as some grammarians express it, meaning the preposition that the verb takes after it, and before the noun following, is a subject of some difficulty; 'it pleases me' is rendered in Italian by *piace a me;* 'he thinks of me,' *pensa a me,* &c.

Barberi, in his 'Grammaire des Grammaires Italiennes,' has given some directions about this part of the syntax, and upon the use of prepositions in general. A dictionary of the Italian verbs, after the manner of M. Tarver's Dictionary of the French verbs, specifying the prepositions which each verb takes before the noun or infinitive following it, is wanted, and would prove a very useful book to the Italian student.

With regard to the mechanical formation of the verbs, their inflexions and irregularities, there has been no want of expounders. Pistolesi published a treatise on the Italian verbs, and Mastrofini after him wrote two good-sized quartos on the same subject, which, however, Compagnoni mercifully curtailed and compressed into a small 12mo. 'Teorica dei Verbi Italiani, regolari, anomali, difettivi, e malnoti.' Milan, 1820. It is a useful little work.

Certain prefixes being coupled to verbs or verbal nouns always produce the same modification in their meaning; *dis* answers to the English *un:* thus *fare* signifies to do, *disfare* to undo; *piacevole,* pleasant; *dispiacevole,* unpleasant; *simile, dissimile,* &c. But the use of this prefix in Italian is carried to a greater ex-

tent than that of either the *un* or *dis* in English, as may be seen by looking in the dictionary at the letters '*dis*.' *Ri* likewise invariably means repetition; *fare*, *rifare*, to do again; *rifacimento*, *rifatto*. *Stra* implies excess; *cotto*, cooked; *stracotto*, overdone. *Tra*, *tras*, and *trans*, answer to the English *trans*, &c., *tra*piantare, *tras*portare, *transfigurazione*.

We would advise the student, as soon as he is able to write connected sentences in Italian, to take up a good prose book, either epistolary or narrative, such as Bentivoglio's Letters, edited by Biagioli, or those of Annibale Caro, both excellent models of style; and having translated some pages into literal English, so as to understand thoroughly the meaning of the author, to retranslate from his manuscript into Italian. After this, he should compare his own version with the original text, and observe those variations in the former which proceed from bad grammar, and those which are owing to idiom or peculiarity of style in the author. The former he will of course immediately correct; the latter might be noted down in a vocabulary or phrase-book. By persevering in this course he will acquire a much sounder knowledge of the language and its peculiarities than by labouring, week after week, and month after month, in translating into slovenly Italian the ill-digested mass of unconnected dull sentences under the name of exercises, with which most grammars are swelled. We do not mean to say that, in the first period of his study, the various rules of grammar should not be illustrated each by a few short sentences; but these ought to be taken as much as possible from some writer of established authority, as Biagioli has done in both his grammars; the only fault is, that his

quotations are too frequently from the poets; we should always prefer quoting from prose-writers. And here we touch on another point, to which we would call the earnest attention both of masters and pupils. It has been too much the practice to put at once into the hands of students the works of the great Italian poets, instead of beginning by grounding them well in good colloquial, epistolary, and narrative prose-style. The practice appears to us so absurd, that we can only account for it by the remark, that as the study of Italian did not constitute, until lately, a part of education in Italy, the Italian prose-writers, with few exceptions, such as Boccaccio, were hardly known to the Italians themselves, and people had at last adopted the notion, which we have ourselves often heard expressed, to our astonishment, that the Italian language was only fit for poetry. The editions of most Italian prose-works were old, scarce, inelegant, and cumbersome, and lay neglected in the dust of libraries. It is chiefly within the last fifteen years that new and cheap editions of the Italian prose-writers have appeared in great abundance; Italians, as well as foreigners, have found out that Italy was as rich as any country in almost every branch of a national library, with the exception, perhaps, of *novels* in the modern acceptation of the word, for of tales there is a superabundance; the deficiency, however, in novels, Manzoni, Rosini, Azeglio, and others, have since filled up.

The language of Italian poetry is so different from that of prose, that a student who has read only the poets will never be able to express himself intelligibly either in writing or speaking. Another objection we have to the early use of the poets, especially by females,

is, that most of them are exceptionable in a moral point of view. Some parts of Ariosto and even of Tasso cannot be translated to a young female; and if the teacher passes them over, the omission has nearly as bad an effect as the explanation would have. We speak from experience, for we remember finding ourselves in an awkward predicament, being requested by a young lady to read to her Ariosto, which she had already begun under some other advice, until we came at last to a dead stop. Teachers, if requested to read objectionable works to a female pupil, should say at once honestly, either to her or to her parents, that they are not books for young ladies. This is not prudery, but common propriety. In Dante likewise there are passages that cannot be explained to a lady. Petrarch is harmless, though rather too languishing and amorous, yet we would not object to it, especially as the beauty of its language is so great. Metastasio is easy, and affords a pleasing light sort of reading.

Alfieri's tragedies, with the exception of Mirra, all the works of Ippolito Pindemonte, a favourite writer with us, Pellico's dramas, Monti's Basvilliana and Mascheroniana, the Visioni of Varano, the fables of Pignotti and of Bertola, Ugo Foscolo's Sepolcri—these are books that can be put into any one's hands. But we should wish to see a pupil well acquainted with prose first. Let him read the historians as soon as he is able, for Italy can truly be said to boast of her historians. Dino Compagni, the two brothers Giovanni and Matteo Villani, Machiavelli, Segni, and Guicciardini, form a splendid series. We would particularly recommend Machiavelli's History of Florence for the simple nervousness of his style. All Machia-

velli's historical and political works deserve to be studied both for matter and manner. He was one of the greatest minds that Italy has ever produced; he was a plain-spoken man, one of the last of the old school of Florentine writers, before courtly flattery and foreign servility had corrupted the Italian style. Boccaccio is of course unfit for young people on the score of morality.

We ought to say something of dictionaries and vocabularies. We have recommended a short grammar, but we do not recommend a pocket dictionary. The latter is only useful to travellers, and for such Graglia's English and Italian is the best. But let the student at home provide at once a good dictionary, such as Alberti's Italian and French, of the late editions of Bassano or Milan, 2 vols. 4to. The great dictionary of Bologna, just completed, in 7 vols. 4to., is too bulky and expensive for common use. It is, however, the fullest dictionary of the Italian language existing, and ought to have a place in every Italian library. It contains, besides all the words of the dictionary of La Crusca, the additions supplied by Monti in his Proposta, and by others, and all the technical words of arts, trades, and professions, with which the Italian language has been enriched for a century past. It also contains at the end a copious vocabulary of Christian and other names of persons, and another of geographical and historical names, both substantive and adjective.

For those who wish to study particular works relative to arts or sciences, there are technical vocabularies, such as Dizionario Botanico di Gallizioli, 4 vols. 4to. Firenze, 1809-12. Dizionario ragionato di Commercio e Giurisprudenza marittima, di Baldasseroni, 4 vols. 4to.

Livorno, 1813. Dizionario Militare Italiano di Grassi, 2 vols. 8vo. Torino, 1817. Vocabolario di Marina, di Stratico, 3 vols. 4to. Milan, 1813. Dizionario delle Belle Arti del Disegno, 2 vols. 8vo. Bassano, 1797. Dizionario do Veterinaria di Bonsi, 5 vols. 1794. Dizionario Etimologico di tutti i Vocaboli usati nelle Scienze, Arti, e Mestiere, che traggono origine dal Greco, compilato da Bonavilla, e continuato dal Professore Marchi, 3 vols. 8vo. Milano, 1820. Dizionario Etimologico Scientifico, 3 vols. 16mo. Verona, 1820 (the first volume contains the words used in metaphysics, jurisprudence, and literature; the second, those belonging to the natural sciences, mathematics, and geography; the third, the historical and mythological words). Also a Dictionary of Medical and Surgical Words by Pasta, Brescia, 1769, and Verona, 1806, and the *Rimario* or Dictionary of Rhymes, by Rosasco, 4to. Padova, 1763.

The great affinity between the Italian and Latin languages, especially in all that concerns etymology, the derivative words, verbal nouns, the inflexions, &c., renders the grammars and dictionaries common to both of great service to the student. Soave's *Grammatica delle due Lingue Italiana e Latina*, Milano, 1820, which has been adopted by the gymnasia of Lombardy, can be justly recommended.* From Soave's Grammar the Abate Bianchi has made a smaller one only for Italians, called *Grammatica ragionata della Lingua Italiana*, Brescia, 1829, with many additions. We have found more sound remarks in this two shilling little book, es-

* We cannot say as much of Soave's *Novelle*,—a book we have seen used in this country, the style of which is far from correct. We should always advise reading the old writers in preference.

pecially concerning the derivatives, the prefixes, and affixes, and the government of nouns and verbs, than in most of the other Italian grammars put together.

We will transcribe here, as a philological curiosity, illustrative of the great etymological affinity between Italian and Latin, the following lines, quoted by Gamba, and addressed to Venice by a citizen of that republic before its fall, and which read equally in both languages. It is of course a constrained composition, and serves merely to show the possibility of the thing :—

Te saluto, alma Dea, Dea generosa,
O gloria nostra, o Veneta Regina!
In procelloso turbine funesto
Tu regnasti secura ; mille membra
Intrepida prostrasti in pugna acerba.
Per te miser non fui, per te non gemo;
Vivo in pace per te. Regna, o beata,
Regna in prospera sorte, in alta pompa,
In augusto splendore, in aurea sede.
Tu serena, tu placida, tu pia,
Tu benigna ; tu salva, ama, conserva.

There is also the following well-known invocation to the Virgin Mary, the lines of which, besides the words being in both languages, retain the poetical measure in both :—

In mare irato, in subita procella,
Invoco te, nostra benigna Stella.

The English scholar will find out in studying Italian, that the syntax of the latter approaches that of the English more than the French does, and that many Italian works can be better translated into English than into French, and *vice versâ*, from the English into Italian. Professor Rossetti, of the King's College, justly observes, that between the French and the Italian there is a mere etymological affinity; while between the Italian and the English there is the more important analogy, that of

construction; and that while the French student can easily understand the meaning of most Italian words, the English will, with greater facility, seize the meaning of Italian sentences and periods. There is also a greater sympathy between the literature of the two latter countries; both have distinct languages for prose and for poetry; the same roundness of periods prevails in both; both are capable of a great variety of phraseology, and the English comes much nearer to the Italian than the French in its susceptibility of inversion. We would therefore advise English pupils to study Italian by means of their own language in preference to adopting the medium of the French, which, in many cases, will prove to them a hinderance rather than a help.

ON LEARNING SINGING.

By MR. BARWELL.

(From the Quarterly Journal of Education, No. XVIII.)

Singing is an acquirement which perhaps gives more general pleasure than any other accomplishment, since it affords gratification even to those who are ignorant of the art, and does not, like instrumental music, require a practical audience in order to be appreciated, nor, like painting, a particular education in order to perceive its beauties. The love of sweet sounds seems a part of our nature; and these, when connected with poetry, address themselves to the understanding and to the sensibility, as well as to the ear.

Music, and vocal music especially, forms a valuable addition to domestic enjoyments, and as a female accomplishment deserves cultivation upon this ground, as well as upon the principle that women should possess as many rational resources as possible both for their own happiness and that of those who look to them for solace and amusement. While we urge the expediency, and in some sort the necessity, of acquiring the art of singing, we must allow, that it already often engrosses a large portion of female education, to the exclusion of many more important attainments; and we regret to add, that, after much application of time and labour, the result is frequently either entire failure, or at least partial disappointment—for which we account in the following manner.

Singing is properly regarded as a part of female edu-

cation; yet the necessary organic formation is not generally considered in the outset, neither is the end proposed precisely ascertained, nor the best means of attaining it determined. Parents wish their children to be musicians, and yet it often happens that they are themselves entirely ignorant of the real meaning of the term, and unable to decide what constitutes excellence in the art, or how that excellence may be obtained. On the other hand, many persons of uncultivated ears and indifferent education imagine that singing is a gift of nature, and requires no training; but this is a mistake. In the art of speaking, defects are to be overcome, and particular kinds of excellence acquired by a proper training: so is it with singing; both arts alike require discipline.

It has been often said, that nothing is worth learning that is not worth learning well. This maxim applies to music equally with other things; and for this reason we would endeavour to show how an acquirement which contributes so largely to individual and general happiness may be best attained, and with the least expenditure of time. We shall here confine ourselves to singing, the highest branch of the art, which more completely calls into exercise the sensibilities of the performer than any other branch of music. We do not propose to treat of professional education, and we are also speaking of female instruction only, though most of our remarks are generally applicable.

We presume that the pupil has some knowledge of music; that she plays the piano-forte as well as is usually judged necessary to accompany herself, and understands musical terms. It is first necessary to ascertain whether the voice and the ear promise any results, and when parents are not themselves qualified to

determine this point, they must consult disinterested and competent judges. The cultivation of a feeble voice requires time and labour on the part of the pupil, and probably the result will be only mediocrity.

In determining the natural capabilities, there are two points to be examined, first, whether there is any power of imitation, since it is evident that all singing must be resolved into an imitation by the voice of sounds heard by the ear. If the pupil is totally incapable of repeating the sounds of an instrument, or another voice, all attempts to learn singing are hopeless.

Secondly, presuming the imitation to be made, it must be next ascertained whether the notes be strictly in tune, and if they be not, whether the imperfection arise from a density of hearing, or from weakness in the voice itself; and also (which a few trials will decide) whether the natural defect in formation is likely to be overcome by practice. It must however be borne in mind, that the few natural notes in the human voice are those used in speaking, and that the high and low tones have mostly to be made. The capabilities for acquiring these are of course greater in some than in others.

If these points be determined unfavourably, we conclude that no rational person would contend against nature in a matter which does not concern the moral welfare of the pupil; and that, where organic capability does not exist, the attempt to learn will not be made.

Those who do not possess the qualities which are essential to a singer have other sources of gratification, which, when judiciously cultivated, will be productive of equal pleasure. We would therefore earnestly recommend persons who are not so gifted to waste no time on a pursuit the failure in which will inevitably

produce great disappointment, and something like disgrace, since a want of success will be put down by the world to general natural incapacity, ignorance, idleness, or insensibility.

We next consider how the pupil whose natural organs are worth cultivating may be best trained. The object of vocal art is to produce agreeable sounds, and, at the same time, to modify those sounds to the expression of the words which are uttered in connexion with them, and which are presumed to have dictated the sentiment of the melody to the composer. The word *tone** comprises all the elements of the art; and the power of varying the character of tone constitutes expression. However sweet, rich, or powerful a voice may naturally be, cultivation and practice alone can confer the power of modifying its quality to suit the sentiment or passion which the words and the music express.

Purity of tone (which necessarily implies perfect tune) is the first object to be attained in learning to sing; and to acquire this, the practice of the diatonic scale, ascending and descending, beginning on C natural (the C on the first ledger line below the lines) and ending where the compass of the voice ceases, ought to be steadily pursued,

By *pure tone*, we mean that the notes emitted by the voice are free from the guttural thick sound which shows that they are formed in the throat—from the snuffling which indicates that the nose is not performing its proper function—and from the muffled indistinct sound which indicates the improper action of the

* It must be observed that *tone* and *intonation* are distinct things: the former refers to the quality or character of the sound, the latter to its tune or pitch.

tongue and lips. Some one of these defects is generally perceptible in amateur singers. The Italian method of instruction is the only system which makes pure tone the basis of vocal instruction, and it is this that we would here recommend and explain. Nothing is more difficult than to describe *sound;* but a good model may always be selected, either among the profession or amateurs, whose tone may be imitated with advantage, and this without any fear of degenerating into a mere copyist, for singing, like speaking, is necessarily, in the first instance, purely imitative.

The diatonic scale, ascending and descending, ought to be executed in the following manner. Let the pupil pronounce the Italian letter *a*, which is uttered like the *a* in the English word *father*, and begin the note very soft, swelling it gradually to the full power of the voice, and then as gradually diminishing it to the softest sound. The mouth must be opened rather wide, a little elongated, and kept steadily in the same position till the note is ended; for it is evident that the size of the aperture through which the sound issues must alter the character of that sound, even if it do not affect its tone or pitch, and a variation in the tone during the production of a note is always bad; the *quantity* but not *quality* may change. This method ought to be applied to every note in the scale, going on to the second octave, and descending as soon as the voice has reached the extent of its compass, taking care not to strain it beyond that compass.

In all voices the upper notes are formed by using what is called *falsette*, or *voce di testa*, which we may translate by the words *head-voice*. This term seems to imply that the voice comes from the head:

but the fact is, that all falsette notes are produced by an action in the upper part of the throat, and the tone is sensibly felt in the head. The pupil must, while practising, employ her whole strength, since this is the only means of acquiring command of voice. The high notes will at first be harsh and shrill, and can only be rendered soft and sweet by continued practice, until which, they are wholly unfit for chamber singing. The power of singing soft, and at the same time of giving *tone*, is one of the best qualifications of a singer, and can be acquired by first practising with the full power of the voice.

The singer, in practising the scale, should discover where the chest (or natural voice) ends, and learn to unite it to the falsette, so that no breach or striking dissimilarity between the two voices may appear. The falsette will require to be strengthened, and at the same time the cultivation of a sweet and pure tone carefully attended to ; for as we have just observed, the agreeable quality of all high notes depends upon cultivation, since there are few voices which produce them naturally.

Particular attention should be paid to taking the breath. A long note cannot be held unless the lungs are fully inflated, and this is equally important in a succession of short notes, because a frequent inhaling disturbs the smoothness of the performance, and gives an idea of exhaustion which is both painful and destructive of effect.

In practising, the pupil should open the chest by throwing back the shoulders and raising the head, so that the action of the throat, as well as of the lungs, may be unimpeded. The breath should be very deeply inhaled *before* the note is commenced, and should not be emitted rapidly with the sound, but gradually, and in a restrained way, rather than exhaled quickly. By this

means a command of the breath will be acquired, and the singer will never be, or appear to be, distressed, but will have the power of duly apportioning the quantity of force she may be called upon to use, and of applying it where and when it will be required. When the voice has become tolerably steady, and the tune certain, it will be necessary to learn to unite notes; and this may be done by proceeding from one note to the next in a breath, or at intervals of a second, third, fourth, fifth, and so on.

The first note should be commenced soft, gradually swelled, and when it nearly reaches the loudest point the next note taken, and the voice diminished. In passing from one note to another, whether slowly or rapidly, that union should invariably be observed which the Italians designate by the term *legato*, *tied*. This quality is essential to a singer. It may best be attained by the practice of the diatonic scale, pushing the voice from note to note, in ascending throughout the octave, and increasing in loudness; in descending, by sliding the voice from note to note, and decreasing the sound: the rapidity should be increased in proportion to the progress of the student, but all first essays must be slow. The times for breathing will also vary in the like proportion. And here we would caution the singer against changing the syllable, or altering the position of the mouth when executing rapidly; it is a defect which commonly obtains either from carelessness, or from an idea that the execution is thereby facilitated. It may be imagined, that as, in singing words, a constant change of syllables occurs, it is therefore needless to guard against an event which must necessarily take place: every finished singer, however, knows that words may be made articulate, and yet be kept subservient to tone, and that the latter is first to be steadily acquired.

For this reason the voice should be first practised on one and the same syllable.

When the pupil can execute a slow scale, in which each note has the same character of tone (allowing for the modifications caused by a difference of pitch or height), and in perfect tune, with the power of beginning and ending it either loud or soft, and a quick legato scale, possessing the same characteristics of unvaried tone and correct tune, much has been done towards the formation of a singer; at least, the chief mechanical difficulties are overcome. Half an hour a day, regularly and well employed on the best means, will be sufficient for the amateur, but we would earnestly recommend that the voice be used in no other way until good habits have been firmly fixed, otherwise the process of learning to sing will not be unlike the process of Penelope's web, all making and unmaking.

Exercises for the voice (and these are very simple) form the next step: they consist of ascending and descending scales, beginning on the key note and ascending to the octave or the twelfth, and scales of shakes and turns. They also should be practised on the syllable *a*, with the same cautious attention to the purity of tone, correct intonation, and legato execution; taking the breath without effort or noise, yet never suffering it to be exhausted. The pupil, when able to execute these well, will be sufficiently accomplished in the art of execution, for all the demands of a private singer.

Attention should also be paid to the increase or diminution of sound, whether upon one or a succession of notes, giving the loud parts without violence, and the soft with the distinctness of an audible whisper. Contrast is as necessary in singing as in painting, but it is seldom required to be violent; this character belongs

to the expression of strong passion rather than sentiment, and is more suitable to the theatre than a private room. The gentleness and strength, softness and firmness, which combine to form the basis of an admirable female character, are also the best characteristics of her vocal efforts; and the same good sense and judgment which are necessary in her general conduct, must also be applied to singing.

In the acquisition of great execution, the student must be guided by the time which she can devote to practice. It is decidedly an ornamental part of the art, and, when properly applied, a valuable and powerful adjunct of expression. But it is not, like tone, an essential. Voices which are naturally flexible acquire execution easily, while thick and heavy voices move with difficulty, and demand more labour. While we advocate singing as an ornament to domestic life, and as a means of enjoying and bestowing pleasure, we admit that it ought not to engross the time which is due to higher employments or necessary duties, and that the pupil must determine upon how much time she can properly devote to singing, and regulate her studies accordingly. The mode of practice, and the energy of the learner, will convert minutes into hours: half an hour daily will scarcely be deemed too great a sacrifice; and we boldly assert that this is time enough when coupled with regularity and ardour, to produce an agreeable, and, where nature has been bountiful, an accomplished singer. The quantity of the attainment being so regulated, the pupil must attempt no more than it is probable she can acquire: the ornamental part of the art must therefore be the last considered. The essentials are tune, tone, the expression, which results from the singer's capability to make the voice perform her intentions and con-

ceptions, and the power of producing the precise quality of tone which will best express the various emotions of joy, sorrow, love, anger, disappointment, or calm delight. In plainer language, we may say that the pupil must learn the simple means of expression, and then the power of applying them. Until these are acquired, she has no pretension to be styled a singer at all; and when they have been obtained, it depends upon opportunity and other circumstances whether the acquisition ought to be carried any farther.

A certain quantity of practice is necessary to retain all knowledge; a little more than that quantity will enable us to extend our knowledge or attainments. All things either retrograde or advance, and those persons only who understand the value of minutes actively and rightly employed, can conceive how much may be done by the regular application of a short time daily; and most particularly is this the case in singing. We say this to encourage those whose wishes go beyond their apparent means, and whose natural powers are good.

Having thus described the course of study necessary to acquire the first principles of the art, we proceed to the adaptation of words to sound. It is a rule that pronunciation must be distinct, and free from vulgarity or affectation; the inaccuracies of dialect are even more disagreeable in singing than in speaking. It must be perceptible to every one that there is a melody that belongs to each country, as well as a peculiarity of pronunciation; this character of speech will also impart itself to the tone of a singer, if not guarded against.

Though distinct utterance is essential, the pupil should be on her guard against that sharp pronunciation which separates the speaking from the singing, so that the words appear to come upon the ear uncon-

nected with the tone of the voice. If words be clearly begun and perfectly finished, they will fall distinctly upon the ear, and will neither impede nor be impeded by the tone. A clear and finished enunciation, when not carried to excess, also imparts a general finish to tone and manner. The tongue must be held rather back in the mouth, and the lips not suffered to hang loose, or they will make the pronunciation, as well as the tone, thick and indistinct.

Attention should also be paid to the meaning of the words, to their accent, and to the rhythm and sentiment of the poetry; for unless the sense be ascertained, the right expression will be wanting, and every singer is expected to unite her own conceptions with those of the composer. As an actress studies her part, adapts her voice and actions to the emotions described by the language, so should the singer comprehend and feel the poetry, and apply the tone, which is her vehicle of expression, to convey the sentiment of the words which she utters.

Recitative, as the term itself implies, approaches more nearly to speaking than to singing: it is commonly so written that one note falls to each syllable; it requires more of striking enunciation, and less of singing, than the performance of an air; and some compositions (Handel's more especially) call upon the performer for the feeling and elocution of an orator, rather than the qualities of a singer, since she is neither limited by time nor rhythm, but solely by the accent o the words themselves. It is therefore in recitative especially that the elocutionary defects of the singer are detected; and it is consequently the best exercise for the attainment of articulate and finished pronunciation. But in singing an air, the speaking must

blend so entirely with the tone, that although the audience may be able to hear every word, yet the speaking must be only as an adjunct. The poetry ought not to be the prominent part of a song; the pronunciation, as in reading, should be articulate and free from vulgarity or affectation. There is a standard which all educated persons are supposed to possess in speaking, and to this they must refer in singing. In taking breath, the singer must endeavour not to breathe in the middle of a word (unless it be before a passage of execution), and also not to break the sense of the words or the accent of the melody. The singer should not change the vowel or syllable upon which she may have to hold a note or execute a passage, since it will detract from the beauty of articulate speaking, as well as from correct tone.

As to the ornamental part, professional singers are expected occasionally to alter or add to the notes set down in a melody, for the sake of novelty and variety, and also for the purpose of exhibiting their peculiar attainments, or their invention and imagination. The nearer an amateur approaches professional excellence, the more highly is she estimated; and this custom is consequently practised by the former where music is highly cultivated. It is obvious that, in order to create new combinations of notes, the mind must be stored with examples, and possess the power and habit of invention; and in order to apply them tastefully and appropriately, there must be a perfect understanding of the style of the composer, and of the character and expression of the composition. All this information and ability presumes an acquaintance with the science of music, an intimate knowledge of style or a wide

and extensive reading in the works of various masters. There are, however, some persons with retentive memories, quick apprehension, and refined feelings, who can remember and apply ornaments appropriately and effectively. But these are exceptions, for this capability is generally the result of study, and requires more time and labour than singers can commonly bestow. There are some graces which are indispensable, and call for no such exertion, nor such expenditure of time, but only patience and industry. The shake is one of these. It should be first practised on the middle of the voice, beginning slow, and gradually increasing the velocity. A perfect shake is rapid, but distinct, liquid, smooth, and full of tone. In old English music it almost invariably terminates every composition; the Italians use it more as a passing grace, either very slow or very quick. The singer ought to be able to make a shake on every note of the voice; but though essential in the middle, it is not often required at the extremes of the compass. It demands some labour and more patience on the part of the pupil, but is an indispensable ornament to an English singer, and well worth the trouble of acquiring.

The mordente, and the turn, both plain and inverted, are other necessary graces, requiring liquid tone and distinct but legato execution. Their application, where not designated by the composer, must be regulated by the sentiments of the passage to which they are affixed; and their expression may be varied, and a new character given by the employment of different accentuation and tone. A slow inverted turn, though composed of the same notes, bears a totally different expression from a quick turn; and the accent falling upon any one

of the four notes will again change its meaning. Excellence in these minor points is derived from the mind: it is the intellect working with mechanical means which raises artists of every description above the mass. We cannot, therefore, urge too strongly upon the young vocalist to exercise her understanding at the same time that she practises her voice and her fingers.

We will endeavour to describe a more modern ornament of Italian origin for which we know no name, but which is full of elegance and feeling. It is generally used at the end of a musical phrase where the same note is repeated, and it consists in a gentle glide to the third above, which last note is just touched, and the next note descending dwelt upon more at length, ending upon the second note of the original phrase, for instance, *g, b, a, g:* when properly executed, it resembles a sort of gurgling sound; and when applied in pathetic passages, requires little effort to imagine it a sigh or gentle sob. When given with more boldness it confers dignity, and when lightly executed it imparts a playful character.

The appogiatura is another addition, the use of which calls for the discretion and judgment of the performer. It is too common to need description; it requires legato execution, and may be varied in rapidity, accent, and tone, according to the expression required. The Italians almost invariably introduce the appogiatura, when the same note occurs twice in succession: this frequently happens in recitative, when the rule is that the singer instead of taking the first note as it is written introduces the note above, or the half note below, as an appogiatura.

Another modern application of this ornament consists

in repeating the appogiatura a second, or even a third time before taking the note which it precedes. The execution of the repetition should be soft, like a throb of the voice, if we may be allowed the expression.

The portamento, or carrying the voice from one interval to another, comes perhaps under the head of legato execution. It consists in sliding the voice through the intervening notes. Italian singers rarely omit so to connect the notes: in English music it must be employed with caution, and under all circumstances it ought to be used without violence; otherwise, it has a ludicrous effect, and resembles a caricatured imitation of the Italian manner.

It has long been the fashion to conclude English songs with a cadence, why, we know not, unless it be to give the singer further opportunity of displaying his execution and invention. The Italians have better taste, and although they may be justly accused of ending all their arias alike, yet this is a less obvious absurdity than commencing a long roulade upon a word of no meaning, when the sentiment has drawn to a close, and passion has vented its fervor. The singer has every opportunity in the course of an air to show her taste and ability, and these are not unfrequently best displayed by a sparing rather than a redundant use of ornament. It is desirable to possess the power of execution, but equally so to employ it judiciously.

We have now treated of tone, execution, elocution, ornament, and expression. We come next to style, or the peculiar mode in which all these means are employed. It seems impossible that a succession of notes arranged to certain words should be so performed by two or more persons as to bear a different character,

and yet that each performance should be equally successful. This is undoubtedly the case in acting. Actors give the same passage different readings, and accompany it by different action, yet each may claim equal excellence; how else, indeed, should there be variety or novelty, the two great charms of life? So is it with singers. No two voices have the same character, and although trained by the same master and in the same method, yet they are totally dissimilar; and as no two minds are alike, the nature of the intellect gives other varieties which are manifested in conception, imagination, and feeling. For instance, one singer will be distinguished for tenderness, another for dignity, a third for pathos. One will employ mere beauty of voicing, another great power, a third will adopt contrast, a fourth delicate or powerful execution. Some will introduce appropriate but far-fetched ornaments; others, when the character of the words is not decided, will alter the time of a composition from quick to slow, or the contrary, so as to surprise by novelty, or to gain the opportunities of displaying some acquirement or natural gift peculiar to herself. It is also to be remarked, that different kinds of compositions have each their peculiar character. The music of the church in all its subdivisions, chamber music in all its varieties, such as the canzonet, the air, the bravura, the ballad, &c., are distinct species which call into action the same qualifications, but demand an application fitted to the particular nature of the composition. There is also some regard due to the age and country of the composer. Attention to these points implies a general knowledge of the art and its history, and requires more than mere mechanical excellence. All these differences constitute style;

for as they belong to mind, or the attainments resulting from long and diligent study, they will manifest themselves in every attempt, however extensive the field upon which they are exerted. It follows, therefore, that style is a consequence of sedulous practice united to a good understanding, and the experience which comes of hearing and observing; and hence it is that amateurs seldom acquire style. It is lamentable how little the reasoning powers are exercised and cultivated in female education; were it otherwise, the time and money now wasted upon accomplishments would be employed to the advantage and pleasure of the pupil, and of all who expect from her the fruits of those long years which she has expended on her studies.

Those parents, then, who desire their daughters to become singers, must first ascertain how far nature has lent her aid; next, what degree of excellence it is probable they may attain, and whether the talent is to be employed as a means of profit or of mere amusement; and, finally, how much time they can rationally spare from duties and studies of more importance. The next step is to adopt the methods most likely to secure the ends proposed. An honest and capable instructor is essential; but an explanation, such as we have endeavoured to convey of the best method, although necessarily general, will materially assist the pupil, because she will understand why that method is desirable, and being thus led to reflect upon the subject, she will be more likely to apply it advantageously. When some progress in the art has been made, hearing the best models frequently, listening with the mind as well as with the ears, will do more than many lessons carelessly given and thoughtlessly received.

THE YORKSHIRE INSTITUTION FOR THE DEAF AND DUMB AT DONCASTER.

BY CHARLES BAKER,

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(From the Quarterly Journal of Education, No. XIV.)

In a report of the Birmingham Institution for the Deaf and Dumb, recently published, appeared a statement that the number of deaf-mutes in England and Wales alone was not less than eight thousand. This statement was noticed in many of the London and provincial newspapers, and was received in some parts of the country with discredit. From various sources of information, whose accuracy can no longer be disputed, it is ascertained that the proportion of deaf and dumb persons in South Britain is one in seventeen hundred, which, with an aggregate population of fourteen millions, fully establishes the correctness of the Birmingham Report. Returns, in fact, have been procured in various parts of the kingdom on which this proportion is founded. The proportion throughout Europe is $\frac{1}{1585}$.

With such a fact as this resting on unimpeachable evidence, the situation of these helpless beings, in respect to moral culture and improvement, becomes a subject of important and anxious investigation. The difficulty of addressing instruction to minds shut out from the ordinary means of intercourse entails miseries upon this unhappy portion of the community which

cannot be averted by the most tender parental solicitude.

Cut off from almost all communication with the world, the mind so bereft of companionship is apt either to sink into imbecility or to become subject to the development of headstrong and hurtful passions. Without the checks of knowledge and religion, and too frequently spoiled by injudicious indulgence, the temper grows ungovernable, and fits of violence and spleen give a frightful and melancholy aspect to the character. This is the common condition of the poor deaf-mute, without the benefit of that peculiar training which he can rarely receive in the bosom of his family; and it is from the consideration of this fact that public institutions, whose object is to supply by other means the loss of those organs through which knowledge is commonly conveyed to the mind, have received such splendid encouragement from the enlightened and the charitable, in all Europe, in North America, and lately in British India.

Most truly has Dr. Johnson described deafness as the "most desperate of human calamities." With what class of persons can we compare the uneducated deaf and dumb? Not with the idiot, nor the maniac: their deprivation is that of reason, a deprivation frequently more afflicting to their friends than to themselves. In the very possession of reason, the deaf and dumb are more pitiably afflicted than these outcasts, inasmuch as they have a sensibility to something higher than they can attain, a desire never to be gratified, a light within which flashes and gleams at times for a moment, until it languishes for want of something to feed the flame. It has often been said, that blindness is a greater misery than deafness. The reason for this popular opinion is sufficiently

obvious. Blindness claims a readier sympathy than deafness; the one is silent and often retiring, the other can tell its tale of calamity, by which a mind endued with sensibility cannot fail to be deeply interested; nor is it until the contrast between these two calamities receives more than a superficial attention, that the heavier privations of deafness are discovered and understood. We then perceive that the ear is a ready inlet to the mind of the blind, and that a language is already framed in which the blind man can communicate his ideas, and by means of which the most useful parts of knowledge can be conveyed to him in return. But the deaf-mute has acquired no language. A few rude signs, expressive of his physical wants, are the extent of his commerce with his species, until his mind has been developed and informed by a long and tedious process of instruction, through the medium of the eye; and this instruction, in the first instance, must be simplified to the very last degree. Even when educated, the deaf and dumb person can never occupy that station in social life which is occupied by the blind. Every topic of interest is easily communicated to the blind; but to the deaf, much of the enjoyment which results from mingling with society is unappreciated, because unfelt,—unfelt, because he is often a stranger to the more refined pleasures of social intercourse. We speak of the deaf and dumb as they have been and as they are generally educated; we by no means wish to pronounce it to be impossible to fit them for enjoying and even for being useful in society. We know that much has been already done, and that more is being done at present than was ever attempted before; and we confidently anticipate the time when a due proportion of the deaf

and dumb will be raised from their forlorn condition to an eminence which will be at once grateful to them and honourable to their instructors. We have spoken of the difficulty of approaching their minds, compared with that of communication with the blind; we see that this difficulty almost vanishes in the case of the latter; while in that of the deaf it cannot be overcome but by the most patient and persevering labour.

The magnitude of the obstacles to the mental cultivation of the deaf and dumb was doubtless the consideration which prevented many philosophical minds from encountering the labour, even after they had ascertained the practicability, of such cultivation. The general spread of inquiry, especially during the present century, has brought more accurate information respecting the state and numbers of the deaf and dumb; the result of which has been to call forth the sympathy of the public for their relief: and although the provision which is at present made for them is by no means commensurate with the object to be accomplished, there is reason to expect that more ample measures will soon be taken for removing as far as possible the moral and physical evils attendant upon this deplorable calamity. Benevolent minds have been awakened to this duty in our country, among whom the late Rev. John Townsend, the founder of the London Institution, deserves especial notice, as the first individual who effected the extension of education to the indigent deaf and dumb. The imitators of this good and great man in other parts of the kingdom, whose names are recorded in the memory of some hundreds of pupils, are the late Dr. de Lys, of Birmingham; Dr. Orpen, of Dublin; Mr. Bateman, of Manchester; and Mr. Comer, of Liverpool. In Yorkshire, where an

institution for the deaf and dumb has sprung up within a very few years, may be found another gentleman whose name must be ranked with the above benefactors to this class of sufferers: it is the name of its first promoter and honorary secretary, the Rev. W. C. Fenton, whose benevolence and untiring zeal have given it prosperity as well as existence.

As this institution, from its locality in a populous and wealthy district, and the success which has attended its establishment, will furnish us with some materials suitable to the purpose we have in view in this paper, we propose to take a survey of its origin, history, and internal management, and to explain the system of instruction there pursued. One of our objects in doing this, is to diffuse a knowledge of all useful experiments in education, in order that similar institutions may from their commencement be assisted by the experience of others who have gone before them, and so be enabled to profit by what has been found successful, and warned on those points wherein their predecessors have failed.

In the early part of the year 1829, the attention of the county of York was drawn to the establishment of an institution for the education of the deaf and dumb. This institution originated, as we have stated, with Mr. Fenton, a clergyman residing in the neighbourhood of Doncaster, who soon succeeded in bringing the object under the notice of the principal nobility of the country. The Archbishop of York, the late Earl Fitzwilliam, the Earl of Harewood, and the present Earl Fitzwilliam, were among the earliest patrons of the projected institution. Each of these noblemen gave liberal donations; that of the late Earl Fitzwilliam was 500*l.* So patronized in its commencement, the object met with support

in all quarters wherever applications were made, and large sums of money were voluntarily contributed to its funds. At a public meeting held in Doncaster, in March, 1829, which was kindly attended by Mr. Vaughan, the master of the Manchester Institution, with some of his pupils, in order to show that the education of the deaf and dumb was not a visionary idea, a committee was appointed, and it was at once determined to open an institution as soon as the preliminary arrangements could be completed. In the mean time it was thought desirable to obtain for the intended institution the sanction of the Grand Jury, then about to assemble at York. By means of an active member of the committee, the subject was introduced to those gentlemen,—a proceeding which was altogether judicious, as the institution was thus made known to that part of the community from which it was to derive much of its permanent support, namely, the county gentry. At this period the restoration of York Minster occupied the public mind, and the committee thought proper to defer to the suggestions of the Archbishop, and to commence the institution in rented premises, rather than to solicit donations for the erection of a suitable building.

A part of Eastfield House, on the north side of the Doncaster race-course, was therefore obtained, and in November, 1829, fifteen boys were admitted. The institution was placed under the superintendence of the present head master, Mr. Charles Baker. By having spent some years as assistant master at Birmingham, under M. du Puget, who had been educated by Pestalozzi, the system of that eminent man became in some degree familiar to him. At the same time Mr. Baker does not profess to conduct the Yorkshire Institution

on Pestalozzian principles. He acknowledges himself to be too little acquainted with those principles to make any such pretensions, though aware of their value, and of their applicability to a great extent in the education of the deaf and dumb.

The Yorkshire Institution was not founded altogether on the principle of a gratuitous provision. A sum of 2*s*. 6*d*. per week is required from the parents of each pupil, or from the parishes to which they belong. The income of the institution from all sources was about 400*l*. per annum at its commencement. The means by which the income has been increased to its present amount deserve particular notice, as the same means have since been employed with similar success by some of the other provincial schools for the deaf and dumb: we allude to public examinations of the pupils in neighbouring towns. Before the Yorkshire Institution had been established six months, several public examinations had taken place in various divisions of the county. In the more populous towns a lecture was delivered explanatory of the condition of the deaf and dumb, and the methods by which their minds and affections might be cultivated; but the exhibition of the children themselves, and their acquirements, even in the short space of time mentioned, were always found the best exemplification, as well as the most efficient proof, of the excellence of the charity. After these examinations, no one doubted that deaf-mutes had powers capable of improvement; and this was sufficient. Subscriptions and contributions flowed in from every quarter.

In July, 1830, the number of children under instruction was increased to thirty-two,—twenty boys

and twelve girls. The annual funds at this time amounted to about 800*l.*; and the building fund was considerably augmented.

The purchase or erection of a suitable edifice for the permanent establishment of the institution occupied the committee during the year 1831, at the expiration of which it was finally determined to purchase the whole of Eastfield House, which was offered to them, along with three acres of land, for 3000*l.* No site could have been found more open and salubrious. A more convenient building might have been erected, but it would have been at a great additional expense, which might have crippled the operations of the institution for years. The whole outlay amounted to 3200*l.*, including the alterations, of which sum about 360*l.* was advanced from the general fund to be restored at some future period. The great desideratum in the building is a room sufficiently large for a school-room. With such an addition to the premises, the accommodation would be ample enough for one hundred children. As soon as possession of the above purchase was obtained, the number of children was increased to fifty. The annual income arising from subscriptions alone then amounted to little short of 1000*l.* This rapid increase of funds had not been obtained without great exertions; among which must be particularly specified the periodical examinations of the pupils.

Another advantage attending such examinations in different towns, is the publicity given to these institutions, by which parents who might otherwise never know the fact, are informed that such a public provision exists for the mitigation of these organic defects. Even with this publicity, instances are sometimes discovered

of deaf and dumb persons having grown up without instruction, even in the neighbourhood of such institutions. The recurrence of such cases calls for some further exertions on the part of the public to disseminate an account of deaf and dumb institutions amongst that class of society who are most likely to want such assistance, and least likely to know where and how to obtain it.

Various causes operate to prevent a larger number of deaf and dumb children from receiving the benefits of education in so populous a county as Yorkshire; out of a population of several hundreds deprived of hearing, and consequently dumb, it must require explanation why no more than fifty children enjoy the benefit of instruction.

1st. None under eight years of age, nor above fourteen, can be admitted into the institution.

2d. A proportion of the deaf and dumb are diseased, and some to such a degree as to be unfit objects for an institution.

3d. Another class whose names swell the statistics of the deaf and dumb are not deaf, but only *dumb*, being idiots.

4th. Those who are not absolutely idiots, but who are palpably deficient in intellect, are not considered proper objects for an institution avowedly supported for intellectual education.

5th. Some parents are so attached to their offspring labouring under physical infirmities, as to be unwilling to part with them.

6th. Many parents of deaf and dumb children who are anxious to secure for them the mental and moral advantages of education, are yet too poor to make the required weekly payment. In such cases the parishes

to which the children belong often defray the entire charge for the clothing and instruction of such children; but in some instances the parishes refuse this aid.

The last difficulty, here alluded to, it has been thought should be removed by a legislative enactment requiring parish officers to defray the expenses attendant upon the instruction and care of the deaf and dumb poor, on the principle upon which a provision is made for other paupers labouring under severe bodily infirmities. The policy of such a measure is perhaps doubtful; but the claims of the deaf and dumb, it is hoped, will not be overlooked whenever the subject of national education is brought under the notice of the legislature. Both humanity and policy seem to dictate but one course to parish officers. If their deaf and dumb are educated, they are surely less liable to become chargeable to the public than if they continue in ignorance, without the power of receiving or communicating information on the commonest circumstances of life. It would be in vain to expect any proficiency in manual labour in these objects of our sympathy while the main inlets to instruction are closed, and their dispositions, like their understandings, for want of culture, produce bad instead of good fruits. Many facts might be adduced to confirm this statement, but it needs no further illustration: uneducated, the deaf and dumb are almost levelled with the brute creation; educated, they are raised to the proper dignity of their nature.

To confirm some of these statements, we may refer to the experience of the Yorkshire Institution. Since its commencement in 1829, seventy-three children have been admitted, of whom twenty-three have been re-

moved. Of this number, *five* were in the institution only a few months, being found so deficient in intellect as to be incapable of improvement, although capable of doing something for their living in manual occupations of the simplest kind. Their friends were advised to put them instantly to such occupations. *Four* remained in the institution about three years, improving to a certain point, beyond which it seemed impossible for them to advance. These pupils were adapted for some of the more ordinary trades. *Four* others had attained an age at which it was thought desirable for them to leave school, particularly as they were capable of earning their livelihood. *Ten* were withdrawn because their parents could not afford to make the required payment of 2*s*. 6*d*. per week, in addition to the loss of the little services rendered by these children in their families, in all which cases the parish officers refused to advance the payments demanded by the institution. In addition to the above number, *ten* other applicants for admission have been excluded from the operation of the same cause; making twenty who in the course of four years have been denied all chance of instruction, from the extreme poverty of the applicants, or the ill-advised economy of the guardians of parish funds. But while it is painful to record such instances of short-sighted policy, it is pleasing to dwell upon those of an opposite nature,—where parishes most cheerfully contribute the necessary means for aiding the education of these children of affliction. Of such enlightened liberality the parish of Leeds affords a noble example. This parish contributes towards the maintenance of the deaf and dumb children belong-

ing to it, in all cases where the parents are unable to do so.

The system pursued in some institutions makes the instruction and board of their inmates entirely gratuitous, but there are objections to this principle of relief, of which one, not the least obvious, is, that parishes are thus relieved of a burden which is properly their own; while, in other cases, parents who can well afford to pay for the instruction of their offspring too willingly receive the boon, which waits only for their acceptance. Fifty pupils, at only 2*s.* 6*d.* per week each (which is the lowest payment, and is required in all cases), produce about 300*l.* per annum—a considerable addition to the funds of any institution which is not over-prosperous, besides which it has the recommendation of being obtained in a most unexceptionable manner. Those parents who can afford to do so, pay a larger sum towards the education of their children, varying according to their circumstances.

The objection which is most strong against the system pursued in the Yorkshire Asylum, is the fact of twenty deserving and proper objects having been excluded from its advantages, while there is room within its walls for their accommodation. When parishes refuse their assistance in such cases of distress, it is a subject worthy of the best consideration how far it is desirable for the committee to deviate from their general rule, in favour of such applicants.

These preliminary observations will serve to throw some light upon the numbers and condition of the deaf and dumb. We now approach the subject of their instruction, the general principles of which have been

already stated in the Sixth Number of the Journal of Education. The ground-work is somewhat similar in most institutions; the end proposed is uniformly the same—to impart language, and fill the minds of the pupils with knowledge. The means pursued to effect this end differ considerably, and these differences form the basis of the various systems.

The natural language of the deaf and dumb is *a language of signs*. To improve and perfect this language, to make it the vehicle for communicating knowledge, and for interchanging thought, has been a favourite object with many instructors. Signs may be divided into three classes: first, natural signs; secondly, arbitrary signs; and thirdly, methodical signs; the last partaking of the character of the other two. Natural signs are the ordinary language of the uneducated deaf and dumb; arbitrary signs have their origin with system-makers; methodical signs have the fault of being the ideas of the teacher, which may be imitated by the pupil without being understood, just as a native of England might repeat after another person the words of a foreign language unintelligible to him. All these signs, more or less modified, are used in the instruction of the deaf. Some institutions adopt arbitrary signs to the exclusion of natural signs; others make methodical signs the means of communicating ideas; some few profess to reject signs altogether; while by others they are employed in a very subordinate degree, to be banished as soon as their place can be supplied, though but imperfectly, by language.

Speech, or *artificial articulation*, is another medium of intercourse with the deaf and dumb, and it is a valuable auxiliary in their education. There are but

few, especially if they are taught early in life, whose vocal organs will not yield to the well-directed efforts of the teacher. As with respect to signs, so there are various opinions among instructors as to the desirableness of making articulation, and reading on the lips, a part of the education of the deaf and dumb. In some institutions speech is rejected; in others it is made the main instrument of imparting ideas; in some it is used only for conveying words; and in others speech is used simultaneously with signs.

The figuring of objects, as in *drawing*, is sometimes made a matter of great importance. It speaks directly to the eye, and may be made of great service during the period allotted for instruction, and in some cases in after life.

Dactylology, or the *finger-alphabet*, is one of the most obvious and important helps in the education of deaf-mutes; nevertheless, there are some schools on the Continent which reject its assistance. *Writing*, which is most nearly allied to the above process of finger-spelling, is used in all institutions without exception; indeed, it seems almost the only vehicle of which all teachers are content to avail themselves: for however some of them may wish to exclude *signs*, yet there will occur instances when their help must be solicited.

The means at present employed at the Yorkshire Institution are *natural and explanatory signs*, *dactylology*, *and writing*. One or other of these means is used, be it observed, for the communication of everything—knowledge in the school—directions out of it; the end in view being to lead the children to understand language—the English language, and to make themselves understood in it. The conductor is favourably disposed

to articulation wherever the vocal organs are flexible, and the pupil shows no unaptness for its acquirement. No acquisition can be more useful if the speech can be made intelligible. But its utility is much greater as a rapid vehicle for the conveyance of lessons to the pupil, than as an ordinary means of communication; the expression upon the lips of the speaker being required to be so much more distinct and full than could possibly be adopted in conversation without considerable care and practice.

Drawing, as an art, has never been pursued in the institution at Doncaster, for various reasons. It would add considerably to the expense; and as most of the pupils are from agricultural districts or manufacturing towns, where drawing is not much in demand, its acquisition would not materially benefit their future life. At the same time much value is to be attached to it as a means of development.

The hours allotted to school are, in the summer, seven hours each day, and in the winter six and a-half; other employments occupy the hands of the pupils out of school-hours, which will be spoken of hereafter.

At the opening of a deaf and dumb establishment, too many pupils should not be admitted at once. In Yorkshire not fewer than ten, and as many as twenty, have been received at one time into the institution. The first admissions into a new establishment ought never to exceed *ten*. These are as many as a master will be able to manage without assistance. After six months, ten other pupils may be added; by which time, with the aid of those who have become initiated, he will control and keep occupied the twenty, with more ease to himself than he did the first ten. Wherever a

large number of pupils is contemplated, a youth of pleasing manners and liberal education would be found useful as an assistant from the commencement.

The curiosity shown by the older pupils respecting the new-comers, on the day of an admission, is often exceedingly entertaining. The various novelties in the school-room, and other parts of the establishment, are explained to them, sometimes with no ordinary pains and politeness, especially if the new pupils show an inquisitive and lively disposition. The elder pupils, warned by past experience that some sullen or vicious spirit may attempt to steal away, keep their eyes constantly upon those of suspicious appearance, to prevent their escape, and give the first intimation of any such manifestation. At the first outset of an institution, the master has to keep a vigilant watch over his inexperienced pupils. At later admissions, he has all the assistance of those who, having passed through the same ordeal, are willing to exercise the necessary vigilance. All the knowledge which the first pupils possess must have proceeded *directly* from the master. As future additions are made to the inmates of the house, knowledge is obtained on various subjects from the intercourse of the pupils with one another, the result of which is mutually beneficial. A pupil coming from a mining district, by the help of his natural signs, is able to communicate ideas on a subject which perhaps the others know nothing about. In return, they who have received only the very elements of instruction are able to repay the new comer with ideas to which he will have been a stranger till that time. This interchange of ideas is encouraged by teachers, for reasons which are sufficiently evident. Besides, as judicious teachers do

not pretend, even in the presence of their pupils, to be more than learners, they will find it very interesting to allow an intelligent pupil to communicate any knowledge which his experience may have furnished. Nor will a discreet instructor fail to express his pleasure on such occasions, even though the subject illustrated be commonplace. But the great benefit resulting from such intercourse with each other and with the teacher is, that the teacher is thereby informed what are the powers of his pupils, and instructed how to turn those powers to account in directing their future education.

No sooner are the pupils received into the school, than the work of instruction commences. Objects are pointed out to them, the names of the objects are written down, and at the same time the objects themselves are described by natural signs. The pupils readily acknowledge a similarity between the sign and the object, but they do not assent to any likeness between them and the written word. It is only by seeing that the object is recognized in the word, not only by their teacher, but by every person who can be conveniently appealed to, that they perceive that '*words*, by common consent,' represent *objects*. This knowledge they attain, not by the medium of any rule, but practically. It would be needless to enlarge upon this part of the instruction of the deaf and dumb, since it is precisely the practice instituted by Sicard, and described in a former number of the Journal of Education.

This method of commencing the teaching of the deaf and dumb appears preferable to their instruction at the outset in dactylology. The acquisition of the alphabet on the fingers, and the formation of the common written letters on the slate, are a dreary task for a beginner,

often taking many days, and in some instances weeks, and even months, to achieve; while Sicard's plan is full of life and interest, and not only operates upon the mind, but also keeps the body actively employed. At intervals the children sit down to their slates to imitate the forms of the written words which have been made known to them, and in very many instances they learn to write short words as soon as they would learn to make letters. With regard to the finger alphabet, it is not necessary that time should be spent upon it, either by teacher or pupil, except in the case of very dull or very volatile pupils; generally they will learn it by their constant communication with the more advanced classes. Three out of fifteen pupils admitted into the Yorkshire Institution, last August, had to be *taught* the finger alphabet by personal attention; the other twelve *learned* it out of school hours by associating with the elder pupils. In the selection of words for beginners two rules are observed: 1st, that they shall be names of *objects with strongly marked characteristics*, so that the signs for them may be easily recognized; 2nd, that the words shall be short, in order that the combined letters may be better remembered, and more easily imitated on the slate. Such words as the following are examples of first lessons; *ass, bee, sun, fox, owl, frog.* Whenever the real object cannot be exhibited, a picture of it is placed before the class.

The exercises in this first step of instruction are very animating. We will now suppose that some twenty or thirty words have been acquired. The teacher has a black tablet before the class, on which the words are very distinctly written with chalk, and the objects themselves, or pictures of them, are around him. The effect

of the lesson now depends upon the expressiveness of the signs which pass between the teachers and pupils. When speaking of a *sign* or *signs*, we mean shapes of objects figured in the air, denoting the size and other qualities, the motions and positions of objects. The teacher makes a *sign*, we will suppose of a *frog*, in which sign its shape and its mode of leaping are described. A child points to the *object* or its *picture*. The teacher points to the *picture* of this or of some other object; another child makes the *sign* for the object. The teacher points to a *word* upon the tablet; a child points to the objects it represents, or to the picture of it. The teacher points to an *object*, or the *picture* of one; a child points to the *word* which represents it. The teacher makes a *sign*, requiring a child to point to the *word* which stands for it; he then points to a *word*, requiring the child to express it by a *sign*. Might not much of this, or even the whole of it, be introduced into our infant schools? When the finger alphabet has been acquired, a similar exercise to the above is introduced in connexion with spelling the words, the teacher sometimes spelling, and the children signing, or the teacher signing or showing objects, and the children spelling or writing.

All these modes of exercising the pupil are good. After the teacher is satisfied that the child comprehends that pictures and signs represent objects, and that words again represent such objects, he goes on teaching other substantives until the pupil is familiar with the written representation of most common things. The plan by which this end is attained differs in different institutions. That recommended by Mr. Baker is to class all the objects in the material world under two divisions—

NATURE and ART; the former to be subdivided into animals, vegetables, and minerals, and these again into genera, species, and even varieties of the larger animals. Under the division ART, the subdivision will comprehend all trades and artificial productions. It will by no means be necessary to retard a pupil's progress, the first or even the second time of going through the series of lessons, by teaching words of unfrequent occurrence. Such words may be conveyed to the pupil at a future period; or if the lessons are accessible to him, either in manuscript or in a printed form, he will probably acquaint himself with them; and though these lessons may be produced in a scientific form, they may be kept free from scientific terms. In the pictures of *trades*, which should commence with the most ordinary and advance to the most complex arts of life, every object made by man will be brought under the eye of the pupil in its proper place. Tables and sofas will be seen in the shop of the cabinet-maker; knives, razors, scissors, &c., in that of the cutler. Such a series of pictures would be a perfect treasure for the instruction of the deaf and dumb, and would be scarcely less available in the National, Lancasterian, and Infant systems of education; and indeed in the early education of the children of all classes. A good set of pictures of natural objects is also much wanted, which should be executed as far as possible on a scale showing their relative proportions. The lessons connected with trades would commence with the names of the materials used, the articles manufactured, and the principal tools employed. A copious list of substantives would be thus furnished. The next lesson, on the properties of such objects, illustrates the adjective. The nature of neuter,

active, and passive verbs, is then explained, and afterwards the more difficult parts of language. A similar series of lessons would accompany the pictures on natural history. Many names of substances would occur in the course of such a series of lessons which no explanation could render intelligible. Specimens of such things should therefore be procured, if practicable, for the elucidation of the lessons. At the Yorkshire Institution there is a small collection of animal, mineral, and vegetable substances, for this purpose; and if children are to gain ideas as well as words, such a collection should be attached to *every school*, particularly of minerals, and other substances which cannot well be represented by drawings. We have dwelt upon this part of our subject, because we think it suitable for general adoption.

Grammar is best taught by a series of lessons so framed as to illustrate all the parts of speech, and to comprise every class of words in the language. This method is preferable to the dry definitions of grammarians, which never convey any valuable knowledge to children, because they are not understood.

After the specific names of objects have been conveyed to the pupils, *generic* words are taught; these are more difficult than the preceding. It is not easy to make children generalize, unless by means of exercises which have this particular object in view. Tabular forms similar to the following are employed at the Yorkshire Institution:—

Horse	- beast	- animal	- creature	- being	- object &c.
Raven	- bird	- animal	- creature	- being	- object &c.
Shark	- fish	- animal	- creature	- being	- object &c.
Viper	- reptile	- animal	- creature	- being	- object &c.
Wasp	- insect	- animal	- creature	- being	- object &c.
Elm	- tree	- plant	- creature	- being	- object &c.
Heath	- shrub	- plant	- creature	- being	- object &c.
Gold	- metal	- mineral	- creature	- thing	- object &c.
Chair	- furniture	- vegetable substance		- thing	- object &c.
Grate	- furniture	- mineral substance		- thing	- object &c.
Hat	- clothing	- animal substance		- thing	- object &c.
Bread	- food	- vegetable substance		- thing	- object &c.

By these simple means, generic terms are acquired, and many of the children so taught have a clearer understanding of the value of such words than many who can both hear and speak.

The teaching of the indefinite article, the formation of the plurals, regular and irregular, and the office of demonstrative and possessive pronouns, and cardinal numbers, immediately follow the names of objects. These are not taught in an isolated and unconnected manner; they are combined with the words which have been previously taught, care being taken that the idea is conveyed simultaneously with the conventional sign

for it. We may suppose a handful of peas to be taken into the school-room, (objects which the pupils do not commonly see about them being more attractive than slates, pencils, &c., which are always at hand;) one pea is separated from the rest, to which the teacher calls the attention of the class; he writes upon the tablet *a pea*, shows the pea and holds up one finger; he next shows the other peas, or part of them, and writes *peas* opposite to the singular, thus:—

a pea	peas
a dog	dogs
&c.	&c.
my slates	our slates
&c.	&c.

When the plural is written, instead of holding up one finger, he holds up all the fingers of one hand, and moves them backwards and forwards, to express that there are many. If there are several children in the class, it is probable that he will be anticipated in this latter sign by some one of them, who will thus show that he has been accustomed to such a sign, and perfectly comprehends it. The teacher will proceed with other examples, all of which will be written on the tablet in succession. A short time serves to convey this idea to a class. Irregular plurals are so arbitrary in their formation, that they can only be taught by distinct explanations, and retained by an effort of memory. Some curious but at the same time pleasing mistakes are committed by every succession of new pupils in learning the irregular plurals—pleasing because they show how soon children begin to reason from analogy.

After having been shown that the *oo* in *tooth*, *foot*, *goose*, make the plural *teeth*, *feet*, *geese*, they will write the plural of *book*, *beek;* and discovering that *mouse* changes in the plural to *mice*, they will give *hice* as the plural of *house*, making regular plurals irregular, and *vice versâ*. These trifling difficulties are soon removed by watchful attention. Cardinal numbers are taught by the arithmometer or bead-table, and by other visible objects. In this branch of learning the pupils have to remember the combinations of letters, as well as the figures which express the different numbers; and, as a simple exercise in number, they are set to count the panes of glass, the nails, &c., about the school-room, or the grains in a handful of corn.

Adjectives, ordinal numbers, neuter verbs, and active verbs, are the next stages in the tuition of the deaf. The nature of the *adjective* may be conveyed to the mind of the pupil in a variety of ways. Sicard's ingenious plan is adverted to in a former article on the Education of the Deaf and Dumb. A process somewhat similar is employed in most institutions. The intuitive principle is of great advantage in every part of instruction where it can be brought into action. The teaching of adjectives is much helped by contrasts. Two objects of the same name, but of opposite qualities, are put before the eyes of the pupil, who is required to express by signs their distinctive properties. As he describes these, the words answering to the description are written down on the tablet along with the name of the object. Through a long list of adjectives the same course is followed; and it is pleasing to observe the growth and expansion of the mind, in the production even of such disjointed fragments of sentences as *a thick*

book, a thin book ; a long ladder, a short ladder, &c. The ordinal numbers are treated as other adjectives ; but they are never acquired, at least in this institution, without being confounded for a considerable time with the cardinal numbers.

The *participle of the neuter verb* is the next technicality of language which is to be made intelligible. As in the former lessons, the first examples of participles are taken from real actions. There would be some danger of confusing the mind of the pupil here, if care was not taken to show him, at the commencement, the difference between the participle and the adjective, viz., that the former is a mere state of being, liable to change ; while the latter is a quality inherent in the object. If the distinction be not made perfectly clear, such expressions as *a running horse, a flying fly,* would be produced instead of *a horse running, a fly flying.* The participle of the neuter verb is next connected with the verb *to be,* which produces a short sentence, in which the auxiliary is presented in its simplest form, *that horse is eating, this cow is standing.* Sentences are also framed in this stage of tuition from the tabular form of *generic names* by the insertion of the auxiliary verb, as the *horse is a beast.*

Personal pronouns may be now introduced. *I am a boy, Thou art a man, They are noisy children,* in which the different persons of the auxiliary verb are brought into use with their distinctive pronouns, and the sentences are lengthened by the introduction of expressions which have been previously taught.

Active verbs occupy the next place in the series of lessons. These are not taught as solitary words, but in their connexion with words and phrases already

known. The *object* intended to be acted upon is before the class; the *agent* or *subject* of the verb is also before them. Sentences are *acted* before them, something like the following: *This boy is stuffing a bird, The second class are writing their lessons, That tall man is whipping a little dog, I am holding a pointer*, &c.

The *order* in which these sentences should be conveyed to the pupil by signs, is an interesting object of inquiry, as it involves the question of the order of the natural language of the deaf and dumb. That adopted in this school is to present the agent, with its modifiers, if any, first; the object, with its modifiers, second; and the verb, with its auxiliary, last. Thus a sentence would be communicated in the following order:—

1st Sign	2nd Sign	3rd Sign
Man tall that	dog little a	whipping is
That tall man	a little dog	is whipping.

which is ultimately written by the pupils according to the regular structure of our sentences.

What we have hitherto described is the work of the first year at the Yorkshire Institution for the Deaf and Dumb. Out of twenty-two children who were received in August, 1832, seventeen went through a similar course to the one described; in addition to which they learned to write a tolerably plain hand on a slate, the object with regard to writing being, not to waste time in making the children fine writers, but to obtain a plain and rapid handwriting. Indeed, it may be said that

the children are not taught writing; they are left to learn it.

It is an important inquiry, involving a principle of some consequence, whether it is advisable to supply the pupils with a large stock of words indicating objects, qualities, and actions, or whether it is better to proceed with a small vocabulary, without postponing the chief point of early instruction, namely, connected sentences. In the Yorkshire Institution the latter principle is pursued, on the ground of its being important that the pupils should be early brought to express themselves in sentences, and that it is the most simple mode of proceeding.

It would be curious, were there space in this paper for such an analysis, to present to the reader a picture of 'the wild waste not quite without a flower' of the deaf-mute's mind before it is brought into cultivation. In many respects, not in all, it is analogous to an infant's. In the process of acquiring knowledge the same course which seems natural to one may be pursued with the other. Infants, for instance, who are endowed with hearing, although they commence speech by uttering single words, soon adopt connected forms of expression. They do not adhere to certain classes of words, but they use all words which they are in the habit of hearing. Though it may be necessary to instruct the deaf and dumb in words so classed as to show them their different use in language, it is by no means desirable that they should be confined to substantives till they are made acquainted with the names of nearly every common object, nor to adjectives till they have learned nearly all the qualities of such objects. This would occupy much time, and greatly impede their pro-

gress; while on the other hand, if they are speedily brought to forms of expression complete in themselves, and pregnant with ideas, the delay of explaining a difficulty now and then as it occurs will be trifling and unimportant.

The lessons on which the pupils are exercised admit every variety of subject, and are so constructed that physical facts and operations are taught at the same time that the children are acquiring language. A pretty accurate conception may be formed of them from the following skeleton, numbered in the order in which it is taught. The particles and connectives are explained before they are embodied in these lessons.

1

Horse, Mare, Pony, Foal, Hunter, Hackney, &c. } Beast, Quadruped, Animal, &c.
Head,
Ears,
Mane, &c.

2

A horse, two horses,
A mare, many mares,
A pony, three ponies, &c.

3

A shaggy mane,
A fine mane,
A long mane,
A short mane,
A chestnut horse, &c.

4

A horse kicking,
A mare snorting
A pony drinking,
A hackney trotting, &c.

5

That horse is grazing,
Those horses are galloping,
The foal is sucking, &c.

6

The horse is gentle,
Some horses are hard-mouthed,
My horse is strong,
Horses are gregarious, &c.

7

The horse is a beast,
The horse is a quadruped,
The horse is a domestic animal,
Colts are young horses, &c.

8

I have a horse,
Every horse has a mane and tail,
All horses are not broken-kneed, &c.

9

That horse is eating hay,
These coach-horses are pawing the ground,
This horse is licking his knee, &c.

By this method knowledge is communicated simultaneously with language; and if some of the words used in the above lessons appear to be far-fetched or somewhat approaching to scientific terms, it should be remembered that they only present simple ideas, for which reason they are easily communicated, and help to furnish the mind with facts and information. With a deaf and dumb pupil a word is never considered *hard* because it is long. Such words as *gregarious*, *oviparous*, *amphibious*, &c., are descriptive of very simple ideas, and as such are included in some of the earliest lessons.

Many of the pupils now begin to express their ordinary wants by writing on a slate, or by spelling on their fingers. They acquire a knowledge of such forms of expression as the following:—Fetch a chair for this lady. Bring me a pointer. Put a large tablet upon this easel. The boys have no soap. The girls are scouring their bedrooms. Where is our clothes-brush? John —— has fallen down and bruised his eye. Similar communications to these are continually passing between the pupils themselves, and between them and their teachers. From these the beginners pick them up, and learn to apply them with greater or less accuracy, just as an infant appropriates the language spoken in its hearing.

Besides the knowledge here described, the pupils make other important acquisitions. The effect of good education is to promote habits of order, feelings of love to each other and to all men, and the performance of moral duties. Although these duties cannot be inculcated at first by words, they can be enforced by actions and by example,—by a constant occupation of the pupil in body or mind, and by the watchful eye of those above

them to detect and counteract, as far as possible, evil tendencies. When a pupil has been subject to such vigilance for only a few months, a gradual but perceptible improvement invariably takes place. The deaf and dumb early begin to form ideas of their accountability without any direct instruction on this point. In the school-room-meetings for morning and evening prayer —an exercise which is performed by the medium of signs, or by dactylology—and from their continual intercourse with the instructed pupils, the class of beginners perceive that there is a great and all-directing Being; and though their conceptions may be very vague, yet still they are, in some measure, prepared for religious instruction, by means of written language, when it is thought proper to commence this important part of education.

The only holiday in the year at the Yorkshire Institution is at Midsummer, at the expiration of which the new admissions take place. This absence from the scene of their education has always a good effect on the pupils, and more especially on those of only one year's standing. They uniformly return to school with pleasure. Indeed, the contrast between their comforts there and their comforts at home cannot but make them more sensible to the advantages of their situation, besides the pleasure which they must derive from their extensive intercourse among their fellows, compared with their confined means of social communion elsewhere.

The business of instruction is recommenced with the first-year pupils by a repetition of their preceding lessons—a work which occupies a few weeks. The teacher then resumes his lessons on the verbs by proceeding to explain the *simple past* and the *simple future tenses* of

the verbs *to have*, *to be*, and of *regular verbs;* then, he passes on to the *comparison of adjectives; adverbs derived from adjectives;* the *passive* voice of *verbs; prepositions* and other easy particles; and the *definite article. Abstract substantives* descriptive of physical properties come after these.

The past and future tenses of verbs are explained, in the first instance, by diagrams representing the days of the week, the months, the seasons, the days of the year. *A night's sleep gone* (pointing backwards) represents yesterday; *a night's sleep to come* (pointing forward) represents to-morrow; *two to-morrows*, *two yesterdays*, continuing to use the literal translation of signs, meaning the day before yesterday and the day after to-morrow, are as easily described as the nearer periods. For the purpose of teaching present, past, and future time more accurately, a tablet has been provided, of which a sketch is given. It is divided into seven compartments, and the words that are printed here are painted white on the black ground of the tablet. Its size is five feet three inches by two feet.

Three days ago.	Two days ago.	Yesterday	To-day is.	To-morrow.	Two days hence.	Three days hence.

When this tablet is used, the name of the day (say Tuesday) is written upon the middle compartment by

the teacher; a pupil is asked the name of the day before, viz, *yesterday*, and he is desired to write it: he will probably write "yesterday *is* Monday." The opportunity is now taken to show him the auxiliary word which applies to the past—*was*. The same course is pursued in teaching the expression of future time, *will be*, until the words are correctly applied. The compartments on the board serve to record any little events which have taken place or which are likely to take place. The following is a specimen of their use, at first by the teacher, afterwards by the pupils.

Yesterday
was
Thursday, 5th of September.
All the children *went* to see an archery meeting in the afternoon.
Thomas——— *saw* a covey of partridges fly out of the garden, early in the morning.
At seven o'clock in the evening the elder boys *attended* Mr. ———'s lecture on Astronomy.

The divided tablet, simple as it appears, is a most valuable instrument in instruction. The events of to-day, expressed in the *present tense*, can soon only be spoken of in *the past*; while the to-morrow spoken of to-day *in the future*, occupies its place, and in its turn becomes a yesterday.

As the pupils advance from this point, every step becomes easier and more pleasant. *Verbs passive* are

certainly difficult at first. With some modifications the method pursued by Sicard is generally adopted. The *prepositions* which are first explained are those which can be rendered quite sensible, as *on*, *in*, *before*, *behind*, which are very properly called *local prepositions* by Bishop Wilkins in his Treatise on Natural Grammar. Sometimes this class of words is taught by a diagram, similar to that which is given in the above-mentioned work, or by placing real objects in the required situations, instead of drawings. It has been remarked in the course of this article, that words must be classed to show the nature and powers of those words, as well as the similarities which exist among all words of the same class, and their difference from every other class of words. It must, however, be recollected that spoken language will never be learned by such means. It is the constant use of dissimilar words in connexion with each other which makes hearers and speakers understand sentences and utter them correctly. It is the business of the instructor of the deaf and dumb to make his pupils familiar with the construction and use of the mother tongue in all their communications. This is done in some institutions by articulation and reading on the lips; in others, of which that in Yorkshire is one, by writing or by dactylology. This point is particularly attended to in the second year of the pupils' progress, and it is the only method by which they can be made expert in the use and ready in the application of the particles and of other words which present no sensible idea to the mind.

No mechanical exercise of the memory is allowed in this institution. Nothing is learned by heart; if repetitions of lessons are necessary, they are performed

under the eye of the teacher or one of the more advanced pupils, and at each repetition difficulties supposed or confessed are explained. Not a lesson nor a line has been "learned by heart" since the commencement of the institution, nor have any *signs for ideas* been committed to memory without an explanation of the ideas that such signs represent.

The lessons on Language are varied and extended during the second part of the second year by the introduction of printed books. The first book used for this purpose is Miss Mayo's "Lessons on Objects." With a few trifling modifications, which will be obvious to the teacher as he goes through it, this book may be made very useful in the instruction of the deaf and dumb; and their training, which so particularly accustoms them to observe *things*, their *properties*, &c., will enable them to take up the lessons quite in the spirit which Miss Mayo recommends. Another book which is used at this period is Mr. Baker's "Lessons on Natural Religion." The matter of this little work has been taught to successive classes, and it is now published. It is the author's opinion that with all children instruction in natural religion ought to precede that in revealed religion. Such he finds to be the only way of proceeding with the deaf and dumb, who, previous to instruction, have never conceived any notion of the Supreme Being; and his experience among hearing children convinces him that their notions are very often vague and unsatisfactory. As these lessons are the first direct instruction which the pupils receive on the existence of a God, they are illustrated by more examples than are embodied in the published work; the section also which explains the nature of the soul and the operations of the mind, is

considerably amplified at the time these subjects are taught.

Arithmetic is begun in the course of the second year's instruction; its first principles are developed from visible objects, in the way we have already described. Counting as high as a hundred is one of the objects of attention during the *first* year. Notation is not carried much farther before addition and subtraction are commenced. In these developments a little work entitled "Lessons on the Arithmometer, or Bead-Table," on Pestalozzian principles, is used. So far as the writer of this article is acquainted with that great man's principles on the elements of number, no work illustrative of them is so well adapted to young calculators as the one named.

Geography forms a part of the pupil's course in his second year. We cannot better describe the mode in which this science is commenced than by referring to the same subject as taught at Bruce Castle, (page 118, No. XI. of the Journal of Education.) By such an introduction the children understand what they are about from the first; and, as is the case with all subjects which they fully comprehend, they pursue it with pleasure. When a certain knowledge of topography has been acquired, an outline map of Yorkshire on a large scale is shown to the pupils, and the place of residence of each is pointed out. To impart a tolerably correct idea of relative distances, each pupil is led to observe, as if voluntarily, the length of time he was occupied in travelling from his home to the Institution. The situation of Yorkshire on the map of England is discovered as soon as that map is laid before them; and places of which they may have incidentally heard are now shown to the class, the

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My horse has had a disease called the glanders, &c.

13.

Mr. Smith's colt has been shod to-day.

The bay pony will be clipped next November ; then it will have been clipped three times.

I might have been riding now if it were fine, &c.

14.

Horses sleep *in* stables in winter. The fetlock of the horse is *near* the hoof. The shoes are nailed *on* the foot. *Both* John Dobson's horses are dead.

15.

John Dobson has *neither* horses *nor* money. *Sometimes* a mare has two foals. Some horses' cost little *because* they are blemished. A waggon-horse is *much* heavier *than* a race-horse, &c.

16.

The *strength* of a horse is very great. A race-horse has been known to run a mile in a minute—what astonishing *swiftness !* Horses are valuable because they possess *strength, patience, docility, beauty,* &c.

17.

(*A short connected lesson.*)

The form of the horse is elegant, and unites both strength and swiftness. He is useful in lessening man's labour ; and whether engaged in hunting, in battle, in drawing stately carriages or heavy ploughs, he is obedient, &c.

During the third and fourth years of instruction, deaf

and dumb pupils do not, to a superficial observer, appear to make an improvement equally rapid with that of former years; but he who closely examines and compares their progress will discover that their acquirements display more accuracy and solidity than they ever before exhibited. He will find also that the superficial observer, in the pleasure he felt at any degree of advancement, charitably overlooked faults and errors towards which he will be less kindly disposed after the novelty of his first impressions has subsided. In the one case he will be too lenient, in the other too severe.

Composition, which is only encouraged during the second year, is required during the third and succeeding years. It is the pedometer of a pupil's progress; it not only shows the steps he has taken, but it points out his deficiencies in what he is supposed to have acquired. It also shows the teacher at this period, that his pupil still wants the *compound tenses of verbs*, and the more difficult *particles*, and discovers the round-about track which he takes in endeavouring to express an *abstract idea*. These are the confessed difficulties in the instruction of the deaf and dumb; and to these parts of language, in addition to those in which the pupil is found not to be well-grounded, the attention of the teacher will be particularly directed during the subsequent period of education.

In developing more fully the niceties of expression for tenses or time, the inquiry again presents itself, "How does a child become acquainted with the language of its country?" Certainly not by the rules of grammar, nor by any philological lectures; these are for teachers. By mingling with society, by hearing of events referred to time past, present, and to come, and by reading, all

children acquire the forms of speech; but mostly by the first, as is evident from the use they make of phrases and expressions which are current among the persons with whom they associate. A constant exercise in phrases embodying the compound tenses and particles, appears to be the best method of initiating pupils into their correct use. If events do not occur, sentences should be framed on supposed events; but events are certain to occur to bring most forms of expression and most words of importance into use, In this manner, the boy who is constantly having such sentences as the following addressed to him will not fail to understand them, at first with the assistance of signs, and afterwards by mere spelling or writing.

You will have been here three years next August.

This gentleman has been here an hour; he will be here an hour longer; he will have been here two hours, one hour hence.

He should have written his letter before one o'clock.

—— will have had his silver pencil-case two years next May, &c. &c.

Methods of dissecting these tenses are used in the course of the lessons on language during the third year; but the correct employment of them can only be acquired by enforcing on the pupils the use of dactylology or writing to express all their desires, and by encouraging them to detail any circumstances, especially with reference to *time*, which fall within their observation. Much has been written on the particles by De l'Epée, Sicard, and later authors, and some of their diagrams are used in conveying the ideas represented by these words; but, after all, the main instrument for perfecting the deaf and dumb in the use of

connective words is, practice in conversation and composition.

The books used during the third year are, *Lessons on Objects*, *Scripture Characters*, *Lessons on the Creation*, and *First Lessons on Revealed Religion;* the three last written by the conductor of the Yorkshire Institution. In using these books the class write the lesson upon their slates, read it over, and apply for an explanation of those words or sentences which they may not comprehend. The whole lesson is then explained to the class in mimic language; the class again read the lesson, and the questions annexed to it are put to them.

The lessons on "Scripture Characters" are intended to inform the pupils of the leading historical facts connected with the principal persons mentioned in the Old and New Testament. Those on the "Creation" are not only an exercise on the first chapter of Genesis, but also convey much information on the natural world, on the soul of man, and on the attributes of God. The "First Lessons on Religion" profess to inculcate the principles of Revelation. All lessons, whatever be the subject, are given to the pupils either in the expositive or the inductive form, and are followed by a series of questions for their elucidation and development.

There is no greater impediment to the progress of the deaf and dumb in useful knowledge than the want of a variety of books suited to the different periods of their education. Such books can only be written by their instructors, as they alone can be acquainted with the difficulties of such an undertaking. It has been perhaps truly remarked, that the publication of such books, even if they could be written in a manner to

meet the views of all teachers of the deaf and dumb, would involve an expense which their sale would not be likely to defray. Our view upon this question is, that books written purposely for the deaf would be the best elementary works, if well done, to put into the hands of all children.

"The Little Philosopher," by Mr. Abbott, of Mount Vernon School, Boston, has been lately reprinted in England. It has been introduced as a class-book for the pupils of three years' standing at the Yorkshire Institution. Much of its subject matter is very good, and superior to most books of the same nature; but perhaps an exception may be taken to some of its philosophy, and the form in which it is written is objectionable. Nevertheless, as an attempt to bring down philosophical truths to the minds of infants, it possesses much merit, and deserves circulation. The way in which this book is used at the institution of which we are writing, is to recast each subject in the expository form, to explain it if necessary, and then to propose questions upon it for the examination of the pupils. Catechisms in themselves are bad things, and though we would not think of degrading "The Little Philosopher" to the level of Pinnock, yet there is too much of the catechismal spirit throughout the book. Questions too difficult to be answered without some knowledge of physics are frequent in the work. We recommend to those who may use this book, as we would do with respect to some other elementary works, that the whole of the subject-matter of each lesson be communicated to the pupil before the questions are asked, and that there be no committing to memory.

Arithmetic is proceeded with during the third year,

and the pupils are instructed in the use of the dictionary. The latter is a great help to them in acquiring language. All the lessons which they read are first read with this help, and they are expected to apply for information only on those words respecting which the dictionary is not clear and satisfactory.

The same books which are used in the third year, are continued in the fourth, in addition to which Mrs. Trimmer's Sacred Histories and the Bible are introduced. The doctrines of the Christian religion, previously confined to Sunday instruction, are now made a portion of the weekly lessons. Geography and arithmetic are also a part of daily study; and composition is made a subject of greater importance than heretofore. In addition to this the children are expected, out of school-hours, to read certain selections in natural history, upon which they are questioned in school; and as they are accustomed to collect objects of interest which they may meet with in their walks, or when they go home at the holidays, this part of their studies is made very interesting. Even arithmetic is made subservient to the one great end proposed to be accomplished, namely, the communication of language and knowledge. Geographical, astronomical, statistical, and various other questions are asked to exercise the pupil in the practice of calculation, and the facts thus gathered up are by no means unimportant to children who have such limited powers of communication with the world.

The morals of the little community within the walls of this institution are studiously cultivated. Often do its members arrive there with notions the most lax imaginable, and the older they are when admitted the

worse they generally are in this respect; but how can we expect it to be otherwise? Their parents have exercised little or no restraint over them, from inability to communicate on any subject beyond their merest physical wants, so that their evil propensities have grown up with them, and are frequently manifested in their conduct. To repair this deficiency of virtue as well as of knowledge must be the instructor's great care. To secure this object, it is a rule never to allow the children to be alone. An assistant teacher is expected to be constantly among them, to observe what is wrong, and to direct them in what is right; and improper conduct is commented upon in the school-room. Thus their moral delinquencies are detected and exposed, not for the purpose of exciting any improper feeling towards the delinquents, but to furnish an opportunity of appealing to their higher feelings, and to present motives which shall lead them to do right. The result of this treatment generally is, that in the space of a few months considerable improvement takes place in their dispositions and habits. Parents frequently observe this moral change, and indeed it will be more perceptible to them than to those who have the daily charge of their children.

No system of direct rewards has hitherto been pursued, but it cannot be said that *emulation* has not been excited. It is perhaps one of the most difficult considerations which the principal of an institution has to decide, whether or not emulation shall be a leading feature in his plans. We see institutions around us on the two opposite principles—to all appearance equally successful. It is undoubtedly more easy to dispense with rewards than to dispense with punishments. In

this institution it is endeavoured to regulate the punishment by the offence. Loiterers and idlers in school have their stay there prolonged, during which prolongation of school-hours they are kept at their lessons. Solitary confinement, without being so solitary as to affect the nerves, and a bread and water diet, have often been found a salutary check upon offenders. With new pupils, whose minds are yet undeveloped, and who are scarcely susceptible of any higher or lower feeling than physical pleasure or pain, recourse is had to corporeal punishment, if after a second or third offence they still remain refractory. After all, there are very few cases where punishment is necessary, either among the junior or the senior pupils, and with the latter corporeal punishment is very rarely resorted to. Prevention is better than punishment; and ordinary vigilance on the part of teachers will often hinder the commission of a schoolboy's ordinary offences. In reference to the subject of wrong notions and habits in deaf-mutes, great allowances must be made for their errors, great attention and forbearance must be exercised in the work of their reformation, from the slowness and difficulty with which moral considerations are addressed to the mind. The first restraints must be mechanical with them as with all little children. What they do, and what they avoid doing, must for a certain period stand upon no better basis than the directions of their teachers. It is, however, a duty which cannot be lost sight of for a day, to force into their poor unformed minds the reasons on which morality is founded; the injustice and impolicy of theft, the bad consequences of passion, the utility of employment, &c., all which must

accompany, if not precede, appeals to the higher sanctions of religion.

One difficulty with the deaf and dumb, as with other children, is to make them observe and think;—a greater still to get their observations and thoughts embodied in words. Even pupils who sufficiently understand language to comprehend what is said of a subject, do not easily acquire the power of putting their ideas on paper. The organic defects which throw additional obstacles in the way of the deaf and dumb, make his progress in both the above operations slow and imperfect. The labour required, unless it is counteracted by activity of intellect, indisposes his mind to exertion; and he is too credulous, because he is too willing to take for granted whatever is told him with anything like seriousness, however absurd it may be.

At the time of our writing, a few of the pupils of the Yorkshire Institution are entering on their fifth year. The course of instruction laid down for that year is the continuation of arithmetic, geography, morals, and religion, composition, abstract ideas, and figurative language.

Throughout the whole arithmetical course, more attention is given to the principles of the different operations than to the attainment of the power of rapid calculation. The majority of the children acquire enough of arithmetic to carry them through the common affairs of life. The geographical knowledge imparted to them relates chiefly to the physical and political geography of Great Britain. Less time is bestowed upon the other parts of the globe, about which good deal of information is incidentally acquired from their other lessons, and from general reading.

Instruction in morals goes hand in hand with religious instruction, and all pains are taken to acquaint the pupils with those great truths which affect their eternal well-being. The results have sometimes been very pleasing. In teaching the Gospel history, reference is made to Mimpriss's Pictorial and Historical Map of Palestine, which is found a very valuable instrument for imprinting facts on the minds of the pupils in connexion with the places where they occurred. With respect to *abstract ideas*, no mode of development is found so efficient as analysis and ample illustration, aided by constant recurrence to such as have been communicated. Below is an example, which is one of a series of lessons prepared on purpose to illustrate abstract ideas. But all such ideas are not delayed till this period in the education of the children: those of the simpler kind, such as goodness, sin, brotherly love, can be readily exemplified by signs, and they are conveyed to the mind of a child soon after instruction commences.

SENSIBILITY.

We see, hear, feel, smell, and taste, by the help of our *senses*. The body is *sensible* of cold, heat, motion; the ear is *sensible* of sounds; the eye is *sensible* of forms, colours, &c.; the nose is *sensible* of odours; the mouth and palate are *sensible* of different tastes. The *feelings* or *sensations* of the body are sometimes pleasant and sometimes painful. A person who shrinks more than ordinary from heat or cold, has *bodily sensibility*. The mind knows the difference of these feelings, but they are *bodily feelings*.

The mind is not *sensible* in the same way as the body. It does not feel cold, heat, hardness, &c. The

feelings of the mind are joy, grief, anxiety, fear, love, hatred; the body has no such feelings as these; they are *mental feelings*.

If we are blamed without cause, the mind is *sensible* of being wronged; the body feels no pain, but the mind is uneasy and anxious. When such blame cannot harm us, and when we believe that we have done right, if we fret and sorrow we are *foolishly sensible*, and such *sensibility* is improper.

If a person shows great kindness to us or to others, and we feel that we love him in return for that kindness, we are *sensible* of his kindness; such *sensibility* is proper. The person who receives kindness without feeling grateful is *insensible* to kindness.

A man who is always distressed and unhappy on witnessing the common sorrows and privations of mankind has too great *sensibility*.

The boy who can receive continued reproofs for doing wrong without trying to amend, is *insensible* to shame; and he who feels afflicted at every slight reproof has too much sensibility.

From the time that the pupils begin to converse with tolerable freedom by means of natural signs *figurative language* is occasionally employed. From the circumstance of a pupil rising up in the school to exonerate another who has been unjustly accused, it may be shown how an aggrieved party may be *defended* by words, though an actual blow be not struck in his defence. The words are the blows on such an occasion. An expanding flower will give opportunity to speak of an *expanding mind*. Instruction may be called the *food*

of the mind—an analogy which will readily be recognized by every one. Knowledge and ignorance may, in the same way, be compared to light and darkness. Hundreds of familiar examples occur in the routine of instruction which serve to explain the metaphors with which language abounds. Fables are also used for the illustration both of abstract ideas and of figurative language. These fables, in addition to their own title, have the name of the idea which they are intended to illustrate written over them, in this way—CONTRIVANCE, *The Crow and the Pitcher;* SELFISHNESS, *The Dog and the Ox*, &c. The parables of the New Testament also illustrate figurative language, as well as being adapted to convey important religious knowledge.

A small work is very much wanted, as a school-book, on figurative language, taking a range of illustration from the simplest to the most complex examples, and explaining in a clear, intelligible way, the distinctive marks of metaphors, fables, parables, allegories, personifications, &c. Such a work should abound in examples rather than in dry metaphysical rules; some of the Abbé Sicard's explanations are very plain and concise, but the generality of them are two etymological, and better adapted for a teacher than a pupil.

For such a course of instruction as we have delineated, involving the development of faculties which may evade the unfolding touch of the teacher in the ordinary routine of education, it cannot but appear that *five* years are inadequate to do justice to its various requirements, particularly when it is remembered that the mind comes in a state barren beyond description—

a wilderness at best, but too often covered with brambles. An ordinary child three or four years old has a large stock of ideas compared with those of a deaf and dumb child who has gone through even half of the period usually allotted to instruction. It would be desirable to prolong this term by one year, if it could be done consistently with the claims of other objects of the charity. A sixth year would be more valuable in strengthening and confirming good habits, and preparing the pupils for the world, than any two preceding years of their course. A considerable number of those who gain admission to deaf and dumb institutions do not continue the whole time allowed. Out of thirty-two who were admitted into the Yorkshire Institution during the first two years, only *eight* are entering into the fifth year of their course, and *six* into the fourth; the remainder having been withdrawn for reasons stated in a former part of this article. The evils resulting from such withdrawals not only affect the objects so deprived of education, but will be visible in the revival of that ancient prejudice which represented the deaf and dumb as little better than demi-automatons.

The examinations of the pupils are particularly entitled to our notice. Besides the annual public examinations at Doncaster, and occasional examinations at other populous towns in Yorkskshire, there is at least one yearly examination at the school before the committee of the institution. No prepared questions are asked by the examiner. Those who are present are solicited to take a part in the examination, and frequently do so. Errors are occasionally made, but are

often corrected when the pupil is made to comprehend the question proposed. They are more frequently errors in language than errors of ignorance.

An abstract of the rules of the Yorkshire Institution which apply to the children, may perhaps not improperly be introduced here:—

It is designed to be a school of Industry, as well as of religious and general education.

No child can be admitted before eight, nor after fourteen years of age.

None can remain after the age of sixteen, nor continue more than five years from the date of admission.

Two shillings and sixpence is the weekly payment required towards the maintenance of each child.

Children are elected by subscribers, a rule which has never yet been called into operation, as all qualified candidates have been received.

Children not requiring the aid of charity are received on payment of a sum fixed by the committee.

At the last annual meeting it was agreed that children should be admitted from any part of the kingdom on terms to be fixed by the committee,—reserving ample accommodation for Yorkshire applicants.

The design originally contemplated of making the institution a place of manual labour in the sense generally understood, has not been acted upon. Nor can it be practicable for the children to be taught even the domestic trades, without an extension of the term allotted for their education. So far as the spirit of the regulation goes, it has been adopted to a great extent. The children are trained to habits of constant industry and activity, and are total strangers to listlessness and

its evils. Moreover, the employments to which they are subjected have the happiest effects on their general conduct, and certainly promote cheerfulness of demeanour. Some institutions for the deaf and dumb are strongly opposed to the union of labour and learning. Locke's wise remark has received of late years full and repeated testimony to its truth. Certainly the experience of all who have observed the effect of this union will attest that 'Exercises in the body and the mind may be made the recreation one to another.' Why not, then, turn those hours to account which would otherwise remain unemployed, or worse than unemployed? The boys in the Yorkshire Institution are engaged in various occupations suited to their age and their capabilities. It is a part of their daily business to grind a certain portion of wheat for the consumption of the house. For this purpose the whole number of boys is divided into three classes, each class working every third day: thus the labour is equalized. The mill used for this purpose is a steel mill with two handles; two of the taller boys take hold of the handles, to which ropes are attached and pulled by four or six smaller boys. The operation is very simple, and the task, though it bears no such odious name, is often accomplished in an hour and a half. It is constantly remarked by those who are observant of their conduct, that the class whose turn it may be to work at the mill are very anxious to get through their lessons in school; and on the contrary, that when they have any additional employment, as copying lessons, to be done out of school hours, their work at the mill is gone through more rapidly. This is one proof of the beneficial tendency of such a change of employments. When the mill

was adopted, the boys were told that the supply of flour for the house would depend upon their labour, and it has always been supplied without a murmur, though the consumption is about six bushels per week. This mill, with its dressing machine, was not procured as a source of profit to the institution, but chiefly that the boys might have a certain portion of strong exercise at regular intervals. The saving in consequence of this labour cannot amount to less than 10*l.* annually.

The other emyloyments for the boys are gardening, shoe and knife-cleaning, and a variety of occasional labour, such as is necessarily connected with a large establishment. A tailor and a shoemaker attend the institution for about one week in every month, and the boys designed for those trades attend each of them in the intervals of school business to receive instruction. With greater funds than the institution at present commands, workshops might be erected, and two men pursuing the above trades might be resident on the premises at a trifling additional expense, by which arrangement many of the pupils, if retained a sixth year, might be sent into the world well qualified to obtain a livelihood.

The employments of the girls are rather more laborious than those of the boys. Eighteen or twenty constantly-occupied rooms have to be swept or scoured daily, as well as all the passages and staircases in different parts of the house. The bed-linen and table-linen washing is performed by them, and the ironing and mangling of the other articles. These and other occasional labours occupy most of their spare time; the afternoon of the day is generally spent in mending for themselves and the house, or in making various

articles of wearing apparel for the poor, which are sold with very little profit to friends and casual visiters to the institution. The active employments detailed above have the best effect on the health of the children. The institution has been nearly free from illness from the period of its establishment. The scrofulous affections so common among the deaf have very seldom assumed any unpleasant appearance, nor have they produced any bad effects on their general health.

In the domestic arrangements of the establishment it is worthy of remark that only two house-servants are kept, a cook and a housemaid; the latter to superintend the household work, or to do it, if by her negligence it is left undone by the girls. The moral deportment of the girls, their needlework, and the direction of the domestic part of the institution, are confined to the matron. The two assistant teachers are the only other subordinate officers in the establishment, and their duties are separate and distinct. Besides assisting in the school, the senior assistant watches over the moral and orderly demeanor of the boys when not in school; the junior superintends the performance of the manual labours out of school, preserves the general order of the lessons and apparatus of the school-room, the workshops, and other offices, in which duties he is assisted by the boys; even the least child in the establishment has some work to perform tending to habituate him to order and carefulness.

By means of the manual operations described, the children acquire fixed habits of industry during their continuance in the institution, which habits will generally take any direction their guardians may afterwards prescribe. The boys from agricultural districts will,

in many cases, but not in all, become farm-servants; those from the manufacturing parts will be put to the occupations of their neighbourhood. It is the main design of the patrons of this Establishment to give the pupils such an education as will fit them for filling their station in society with credit to themselves, and with usefulness to others. There are few employments of which the deaf and dumb are not capable; they make good servants, good labourers, good artisans, but not good shopkeepers. Some youths have been employed as ordinary clerks, others as copying clerks in law-offices, and a few have excelled in painting or engraving.

The following tables will give a correct idea of the employments of each day in the fourth year of the course:—

TABLE I.—*Routine of School-business, in the first part of the Fourth Year of the Course.*

Days.	*Classes.* Hours of the day	*Morning.* 6¼—8	8—10	10—11¼	11¼—1	1—3	*Afternoon.* 3—5	5—5¼	*Evening.* 5¼—7¼
				Forenoon.					
Sunday	1st Class	Gospels	Breakfast. Boys at Mill, &c.; Girls at Household Work	Public Worship	Public Worship	Dinner. Boys at Mill, Garden, &c.; Girls at sundry Household Work.	Gospels	All the children taking Exercise.	Gospels
	2nd "	do.		do.	do.		do.		do.
	3rd "	Natural Religion		do.	do.		Natural Religion		Natural Religion
	4th "	Language		do.	do.		Language		Language
Monday	1st Class	Scripture History		Language	Composition.		Copying lessons into books. The junior Class in School for an hour every afternoon, except Saturday. Walks occasionally. The Girls at Needlework who are not otherwise employed.		Geography
	2nd "	Arithmetic		Language	do.				do.
	3rd "	Geography		Natural Religion	Natural Religion				Language
	4th "	Language		Language	Language				do.
Tuesday	1st Class	Arithmetic		Physics	Physics				Geography
	2nd "	Scripture History		do.	do.				do.
	3rd "	Arithmetic		Language	Language				Language
	4th "	Language		do.	do.				do.
Wednesday	1st Class	Scripture History		Language	Bible Exercises				Geography
	2nd "	Arithmetic		do.	do.				do.
	3rd "	Geography		Natural Religion	Natural Religion				Language
	4th "	Language		Language	Language				do.
Thursday	1st Class	Arithmetic		Physics	Physics				Geography
	2nd "	Scripture History		do.	do.				do.
	3rd "	Arithmetic		Language	Language				Language
	4th "	Language		do.	do.				do.
Friday	1st Class	Scripture History		Language	Bible Exercises				Geography
	2nd "	Arithmetic		do.	do.				do.
	3rd "	Geography		Natural Religion	Natural Religion				Language
	4th "	Language		Language	Language				do.
Saturday	1st Class	Arithmetic							
	2nd "	Scripture History		Repetitions	Repetitions				
	3rd "	Arithmetic							
	4th "	Language							

TABLE II.—*Routine of School-business, in the second part of the Fourth Year of the Course.*

Days.	*Classes.*	*Morning.* 6½—8	8—10	*Forenoon.* 10—11½	11½—1	*Afternoon.* 1—3	3—5	*Evening.* 5—5½	5½—7½
Hours of the day									
Sunday ..	1st Class	Gospels		Public Worship	Public Worship		Gospels		Gospels
	2nd „	do.					do.		do
	3rd „	Scrlpt. Charecters					Script. Charac.		Script. Charac.
	4th „	Nat. Religlon (Signs)					Nat. Rel. (Sns.)		Nat. Rel. (Sgns.)
Monday ..	1st Class	Scrlpture Hlstory		Physics	Physics				Geography
	2nd „	do.		do.	do.				do.
	3rd „	Geography		Creation	Creation				Creation
	4th „	Langnage		Langnage	Langnage				Language
Tuesday .	1st Class	Revealed Religion		Language	Composition				Arithmetic
	2nd „	do.		do.	do.				do.
	3rd „	Arithmetic		do.	Objects				Language
	4th „	Language		do.	Language				do.
Wednesday	1st Class	Scripture Hlstory		Physics	Physics				Geography
	2nd „	do.		do.	do.				do.
	3rd „	Geography		Scripture Hlstory	Scripture Hlstory				Scripture Hlstory
	4th „	Language		Language	Language				Language
Thursday	1st Class	Revealed Religion		Bible Exercise	Bible Exercise				Arithmetic
	2nd „	do.		do.	do.				do.
	3rd „	Arithmetic		Language	Objects				Language
	4th „	Language		oo.	Language				do.
Friday ...	1st Class	Scrlpture Hlstory		Language	Composition				Geography
	2nd „	do.		do.	do.				do.
	3rd „	Geography		Creation	Creation				Creation
	4th „	Language		Language	Language				Language
Saturday .	1st Class	Revealed Religion							
	2nd „	do.		Repetitions.	Repetitions.				
	3rd „	Arithmetic							
	4th „	Language							

Note.—The parts of the day between School-hours are filled up by work as in the former part of the year. *See* Table I.

A new arrangement of school business is necessary every half year. The first and second class receive most of their lessons together, though the children are of a different standing in the institution. This is done to economize teachers. By the term language used in the tabular views is meant classes of words and particular forms of expression, from the ordinary noun to abstract ideas. Perhaps grammar would be better understood, but the teaching is carried on without the use of grammatical rules. The lessons are illustrations of grammar, rather than grammar itself; and therefore more properly called language. The word physics means lessons on the properties of natural bodies, such as were before adverted to in "The Little Philosopher." The scripture history used by the third class, which consists of pupils who have been a year and a half in the institution, is written in a style suited to their confined knowledge of language. It is almost without particles, and very free from elliptical expression. As these lessons are unpublished, an example is given below. Would not books for children be better understood if a similar style were used in their composition? In talking to children, we invariably endeavour to omit expressions which might embarrass them, and, at the risk of much repetition, we use language, such as we think adapted to the infantine mind.

"THE PLAIN OF SHINAR.

"After many years, men were very numerous on the earth. Men lived near to each other. They spoke the same language. They liked to live in the same place. It was a pleasant country where men lived. It was a

plain. They wished to live there always. The plain was called Shinar. It was very wide and extensive. There (on the plain) people had their houses, tents, fields, and cattle. The people said :—'We are numerous and strong—we will build a city and a tower—the tower shall be very high—its top shall reach the clouds—let us now make bricks and burn them, and let us make mortar—we will stay here always—we will not go to distant countries—we will not be scattered abroad on the earth.' God saw the city and the tower which men were building. God was not pleased, &c."

It will be borne in mind that these lessons are almost the first complete sentences on a connected subject which are communicated to the pupils, and this is done as soon as they begin to have a tolerably correct idea of the structure of sentences. If the readers of the Journal of Education will refer to the article on "An Improved Method of teaching Modern Languages" in the 8th Number, they will find a precisely similar course recommended; and indeed a German tale is there broken into sentences quite similar to the above example. Deaf and dumb pupils are learners of the English language, and their case is parallel to that of other learners of languages in one respect, though they have to learn through a more intricate medium. The deaf have to ascend from their very meagre language of natural signs to one very rich and full in its artificial expressions for thoughts which have never entered into their untaught minds, thus establishing a wide difference between them and other language-learners. We who hear and speak have clear ideas of all conventional signs in our mother-tongue. The operation with us is only to transfer an idea which we already possess into

the conventional sign for that idea in the language we desire to acquire. The deaf and dumb have to master the idea as well as the sign for it.

Next to a series of reading books on nature, science, and art, too much stress cannot be laid on providing a museum of natural and artificial objects, minerals, metals, woods, shells, models, instruments, pictures, foreign curiosities illustrative of the productions and manners of distant countries, &c. &c. These are the most efficient of all helps to the instruction of the deaf and dumb; they are better than any descriptions, because they present ideas to the mind with more force than words can do, even with all the assistance of signs. A collection of this kind has been commenced in that institution to whose history and prospects we have now devoted our pages, and we would gladly do it some service by recommending its friends to send contributions to the museum. Many specimens have been procured from shopkeepers and mechanics; some have been kindly presented, and others have been collected by the pupils. The more complete such a collection can be made, the clearer will be the conceptions formed by the pupils of the nature and properties of things, an incalculable advantage to all young people, whether endowed with all their senses, or unfortunately deaf and dumb.

Much of the earlier instruction of deaf-mutes might be accomplished before they are admitted into institutions; they might be taught to write, to learn their letters, to spell the names of objects, to learn many of the qualities of objects and actions, either at ordinary schools or at home. It is hoped that some of the teachers in England will publish a series of graduated

exercises in language to aid this desirable work, and that the mystery which has so long shrouded the different methods of instruction in the British dominions will be removed. Already on the Continent we behold the dawning of a brighter day. In some countries the instruction is commenced in the primary schools, and in others books have appeared to assist parents and ordinary school-masters. The institutions for the deaf and dumb at Berlin, Königsberg, Munster, Munich, and Gmünd have been formed into normal schools to train teachers for their respective countries. In Denmark all the deaf and dumb are gratuitously educated at the two schools of that kingdom.

The continental labours in behalf of the deaf and dumb are exhibited in the last circular of the Royal Institution at Paris, from which our few preceding remarks respecting them are drawn. This work appears biennially, or triennially, as the information transmitted to the directors of that institution accumulates. It is printed by the government, and though at a considerable expense, it is sent gratuitously to all known establishments for the deaf and dumb. Its circulation, we venture to say, must effect valuable changes in the education of that unfortunate class of persons to whose interest it is devoted. The mass of intelligence which it contains on the practical parts of instruction can only be appreciated by those teachers who have directed their hearts and their minds to this work of beneficence.

This circular, together with the details of De Gerando, the practical work of Bebian, and various publications which have appeared in Germany, have done more for the improvement of the deaf and dumb, than had been effected in the whole period which elapsed after the

discovery was made that they were not incapable of instruction.

The institutions for the deaf and dumb in England are as follows:—

	Date of Foundation.	Head Master.	Pupils.
London	1792	Mr. James Watson	230
Birmingham	1815	Mr. du Puget	45
Manchester	1824	Mr. Bingham	57
Liverpool	1825	Mr. Scott	35
Exeter	1827	Mr. Gordon	62
Doncaster	1829	Mr. C. Baker	70

There are also institutions for the deaf and dumb at Edinburgh, Paisley, Glasgow, and Aberdeen, and one at Dublin: there are none in Wales.

THE END.

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